The geological history of Southern Dominica and plutonic nodules from the lesser antilles.

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THE GEOLOGICAL HISTORY OF SOUTHERN DOMINICA

AND

PLUTONIC NODULES FROM THE LESSER ANTILLES

Thesis submitted for the degree of Doctor of Philosophy
at the University of Durham.

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APPENDIX 1:1

DETAILS OF SOUTHERN DOMINICA SPECIMEN COLLECTION.

Specimen Collecting.

The Dominican environment has been described in Chapter 2. Such humid conditions are unfavourable for preservation of the geological record, but for two reasons the situation is not so bad as might be anticipated. Firstly, many of the young-volcanic products are very little altered. Secondly, the high rainfall has caused active erosion, and the deep river valleys often provide excellent exposures. Cliffs are well developed around many parts of the coast, whilst man made roadside exposures provide an additional source of specimens. In contrast, the nearby limestone Antilles have relatively low rainfall, and contain older rocks, this makes fresh specimens extremely difficult to find.

A glance at the specimen-locality map will show that the sampling distribution is not even,and tends to follow the roads, coastlines and river sections. This could not be avoided in the time available. Trips were made into the unexplored, forest-covered and mountainous interior; but these tended to be an uneconomic use of time as few fresh samples were obtained. Also,as a group they do not show any significant differences from the more easily obtained specimens. The material obtained has proved more than sufficient for the necessary analytical work, and the writer suggests that further intensive sampling will not significantly extend the presently-known ranges of composition.

The specimens collected during the two field seasons, Feb-April 1971 and 1972, are listed below. The list is as objective as possible,

with question marks indicating any uncertainty. The following explanations refer to the column headings:

SPEC The specimens are listed in numerical order of collection. Specimens 1-250 were collected in 1971,and the remainder in 1972. In the text volcanic specimens are referred to as SD123 etc., the letters indicating Southern Dominica. Plutonic specimens, which are listed in Appendix 2:1, are referred to as D250 etc. Foundland specimens 366-376, 407-425 and 426-449 were all collected from small areas and are indicated thus on the map. The letters H and X refer to host and xenolith respectively. They are used for the 6 pairs of specimens where basic, cognate, porphyritic inclusions (autoliths) have been collected with a host lava at the same locality.

ROCK TYPE A simple subdivision has been used here because chemical analyses have not been made of all specimens. Those analysed have been termed basalt, andesite or dacite at SiO_2 subdivisions of 56 and 64%. The unanalysed specimens are named basalt if olivine is seen, andesite if clinopyroxene is reasonably abundant and dacite if orthopyroxene $\pm$ amphibole and quartz are present. Other rock types collected, in the order listed, are jasper, charcoal, metasediment, gabbro, diorite, mylonite, sand, gravel, limestone, peperite, fumarolic sublimates, hydrothermal calcite and palagonite.

OCCURRENCE AND LOCALITY This background information is taken from the field notes. The occurrence column is somewhat subjective, particularly in the differentiation of thick lava flows and domes; but

in most cases is an accurate description of the field occurrence. The locality names have been taken from the D.O.S. 1:25,000 series maps of Dominica. They only give an approximate location, but are more palatable in discussion and easier to remember than grid references. Most of the abbreviations used are self explanatory, they are listed here in alphabetical order:

ALT	=	altered
CONGLOM	=	conglomerate
E	=	east
ES or EST	=	estate
FRACT	=	fractured
HD	=	head
LK	=	lake
LMST	=	limestone
MN	=	morne
N	=	north
P or PYRO	=	pyroclast
PCBI	=	porphyritic cognate basic inclusion (autolith)
PRECIP	=	precipitate
PT	=	point
R or RIV	=	river
RAV	=	ravine
RK	=	rock
S	=	south
STRAT	=	stratified
VL	=	village
W	=	west
XENO	=	xenolith

CENTRE The centre column lists the volcanic centre from which the material was erupted or found. This was determined in the field assuming that,after extrusion, volcanic products take the gravitationally easiest downhill route to their present position. Centre abreviations are listed alphabetically below:

A	=	Morne Anglais
D	=	Morne Diablotins
ECV	=	East Coast Volcanics
F	=	Foundland
GSH	=	Grand Soufriere Hills
M	=	Morne Macaque (or Micotrin)
PAT	=	Morne Patates
PLP	=	Morne Plat Pays
T	=	Morne Trois Pitons
/	=	not known, usually secondary

ANAL This column indicates if an X.R.F. whole rock chemical analysis has been made, and in which list the analysis will be found. The symbols indicate:

+	primary-volcanic products Ap 1.3.1	p.33
P	pyroclastic sorted specimens Ap 1.3.2	p.57
S	sulphur-rich specimens Ap 1.3.3	p.62
A	altered and non-volcanic specimens Ap 1.3.4	p.63
N	plutonic nodules analyses Ap 2.3	p.104

THIN A + symbol indicates that a thin section has been made.

GRID REF Six figure grid references are given to be used in conjunction with the specimen locality map. These references are as used in the U.W.I. Seismic Unit collection lists; where the first three figures represent thousandths of a degree of latitude 61° north of the Equator, and the second three figures represent thousandths of a degree of long itude 15° west of Greenwhich.

APENDIX 1.1 - DETAILS OF SOUTHERN DOMINICA SPECIMEN COLLECTION

SPEC SD	ROCK TYPE	OCCURRENCE	LOCALITY	CENTRE	ANAL	THIN	GRIDREF 61N	GRIDREF 15W
1	DACITE	LAVA FLOW?	S OF SOURFRIERE VL	PAT	+	+	137	222
2	DACITE	DOME SCREE	W OF MORNE PATATES	PAT			133	221
3	DACITE	FRACT DOME ROCK	GALLION	PAT	+	+	132	222
4	DACITE	PYRO FLOW BLCCK	RAVINE BLANCHE	PAT	+	+	128	224
5	DACITE	PYRO FLOW BLOCK	RAVINE BLANCHE	PAT			128	223
6	DACITE	PYRC FLOW BLOCK	RAVINE BLANCHE	PAT	+	+	128	222
7	DACITE	FRACT DOME ROCK	S OF SCOTTS HEAD	PAT	+	+	126	229
8	DACITE	FRACT DOME ROCK	NW OF SCOTTS HEAD	PAT			127	230
9	DACITE	FRACT DCME ROCK	TOP OF SCOTTS HEAD	PAT	+	+	127	229
10	CACITE	PYRO FLOW BLOCK	SE OF SCOTTS HD VL	PAT	+	+	124	225
11	DACITE	LAVA FLOW	SE OF SCOTTS HD VL	PAT	+	+	124	224
12	DACITE	LAVA FLOW	S OF CRABIER	PAT		+	143	217
13	CACITE	DOME SCREE BOULDER	MORNE ROUGE	PAT			145	212
14	DACITE	LAVA FLOW	SE OF CRABIER	PAT	+	+	143	215
15	DACITE	PYRO FLOW BLOCK	SE OF CRABIER	PAT	+	+	144	214
16	ANDESITE	LAVA FLOW REMNANT	S OF MORNE ROUGE	PAT?		+	144	212
17	DACITE	FRACT DOME ROCK	S OF MORNE ROUGE	PAT?			144	212
18	ANDESITE	LAVA FLOW	S OF BEREKUA	PLP	+	+	139	194
19	DACITE	PYRO FLOW PUMICE	BEREKUA TARISH PIT	PLP	+	+	142	193
20	DACITE	RW PYRO FLOW PUMICE	MORNE PENDU RAV	PLP	+	+	135	198
21	DACITE	LAVA FLOW	PT TANAMA	PLP	+	+	134	195
22	DACITE	LAVA FLOW	GRAND COULIBRI BAY	PLP	+	+	132	201
23	ANDESITE	PYRO FLOW BLOCK	GRAND COULIBRI BAY	PLP	+	+	130	204
24	DACITE	PYRO FLOW PUMICE	GRAND COULIBRI BAY	PLP	+	+	130	204
25	ANESITE	LAVA FLOW	S OF LOUBIERE	PLP	+	+	159	231
26	DACITE	LAVA FLOW	N OF PT MICHEL	PLP	+	+	157	231
27	BASALT	PYRO FLOW BLOCK	S OF PT MICHEL	PLP	+	+	151	231
28	DACITE	PYRO FLOW BLOCK	DEROCHELLE	PLP	+	+	149	230
29	DACITE	PYRO FLOW BLOCK	S OF DEROCHELLE	PLP			147	229
30	DACITE	PYRO FLOW BLOCK	MORNE CABRITS	PLP	+	+	146	229
31	JASPER	MATRIX TO CONGLOM	MORNE CABRITS	PLP	A	+	145	228
32	ANDESITE	LAVA FLOW	POINT CARIB ROAD	F	+	+	144	180
33	ANDESITE	LAVA FLOW	POINT CARIB ROAD	F			145	180
34	BASALT	LAVA FLOW	PETIT SAVANE BAY	F	+	+	148	163
35	BASALT	LAVA FLOW RUBBLE	PETIT SAVANE BAY	F	+	+	148	163
36	DACITE	AIR FALL	PETIT SAVANE BAY	F?	+	+	147	163

SPEC SD	ROCK TYPE	OCCURRENCE	LOCALITY	CENTRE	ANAL	THIN	GRIDREF 61N	15W
37	BASALT	LAVA BRECCIA	PETIT SAVANE BAY	F	+	+	149	162
38	ANDESITE	LAVA FLOW	PETIT SAVANE BAY	F	+	+	149	162
39	BASALT	LAVA FLOW	PETIT SAVANE BAY	F	+	+	149	163
40	ANDESITE	LAVA FLOW	PETIT SAVANE BAY	F	+	+	148	164
41	BASALT	STEEP LAVA FLOW	PETIT SAVANE BAY	F	+	+	147	164
42	ANDESITE	LAVA FLOW INLIER	SULPHUR SPRINGS	PLP?	+	+	141	214
43	ANDESITE	AGGLOMERATE	N OF SOUFRIERE VIL	PLP	+	+	139	221
44	BASALT	AIR FALL	N OF SOUFRIERE VIL	PLP?	P		139	221
45	DACITE	MUDFLOW	N OF SOUFRIERE VIL	PLP	+	+	138	223
46	BASALT	AIR FALL	SE OF LA SORCIERE	PLP?	+	+	140	224
47	ANDESITE	LAVA RUBBLE	NE OF LA SORCIERE	PLP	+	+	141	225
48	ANDESITE	AIR FALL	NE OF LA SOURCIERE	PLP?	P		142	224
49	DACITE	PYRO FLOW BLOCK	BOIS SERPE	PLP	+	+	143	224
50	ANDESITE	LAVA FLOW	BOIS SERPE	PLP	+	+	143	225
51	ANDESITE	LAVA FLOW	E OF PT GUIGNARD	PLP	+	+	143	226
52	ANDESITE	PYRO FLOW	E OF PT GUIGNARD	PLP	+	+	143	227
53	ANDESITE	LAVA FLOW	PT GUIGNARD	PLP	+	+	143	129
54	BASALT	LARGE BOULDER	E OF GALBA	F	+	+	151	168
55	BASALT	LAVA FLOW	E OF GALBA	F	+	+	150	168
56	BASALT	LAVA FLOW	GALBA ROADCUT	F	+	+	151	171
57	BASALT	CRYSTAL TUFF (ALT)	GALBA ROADCUT	F	A	+	151	171
58	BASALT	LAVA BRECCIA	W OF EN BARQUER	F	+	+	149	172
59	BASALT	LAVA FLOW	N OF BAGATELLE EST	F	+	+	151	175
60	ANDESITE	LAVA FLOW	PT CARIB	F	+	+	142	180
61	ANDESITE	LAVA FLOW	PT CARIB	F	+	+	142	179
62	ANDESITE	LAVA FLOW	PT CARIB	F		+	142	179
63	ANDESITE	LAVA FLOW	PT CARIB	F	+	+	143	179
64	BASALT	LAVA FLOW	PT CARIB	F	+	+	144	178
65	DACITE	AIR FALL	E OF PT CARIB	F			143	177
66	BASALT	SCORIA LAYER	E OF FONT ST JEAN	F	+	+	144	174
67	DACITE	AIR FALL	W OF FONT ST JEAN	F	+	+	145	175
68	CHARCOAL	PATCH IN AIR FALL	W OF FONT ST JEAN	F			145	175
69	DACITE	LAVA FLOW	PENDU TEMPS RIVER	W	+	+	159	191
70	DACITE	DOME BLOCK	TOP OF CRABIER	PAT	+	+	128	215
71	DACITE	DOME SCREE?	E OF CRABIER	PAT	+	+	128	215
72	DACITE	DOME ROCK BLOCK	TOP OF MORNE PATATES	PAT	+	+	134	218
73	DACITE	DOME ROCK BLOCK	TOP OF MORNE PATATES	PAT		+	134	218
74	DACITE	DOME ROCK BLOCK	TOP OF MORNE PATATES	PAT	+	+	134	218

SPEC SD	ROCK TYPE	OCCURRENCE	LOCALITY	CENTRE	ANAL	THIN	GRIDREF 61N	15W
75	DACITE	LAVA FLOW?	TERRE ELM	PLP	+	+	145	210
76	DACITE	LAVA FLOW?	TERRE ELM	PLP	+	+	146	211
77	ANDESITE	PYRO FLOW BLOCK	TETE MORNE	PLP		+	140	211
78	DACITE	PYRO FLOW BLOCK	TETE MORNE	PLP		+	139	212
79	ANDESITE	PYRO FLOW BLOCK	GOMIER STEWART EST	A	+	+	168	214
80	DACITE	PYRO FLOW BLOCK	GIRAUDEL	A	+	+	174	213
81	ANDESITE	PYRO FLOW BLOCK	N OF BEREKUA	PLP	+	+	145	197
82	DACITE	PYRO FLOW BLOCK	SE OF PICHELIN	A		+	152	198
83	ANDESITE	MUDFLOW FRAGMENT	S OF MORNE ANGLAIS	A		+	163	207
84	ANDESITE	P FLOW BLOCK+XENO	S OF MORNE ANGLAIS	A		+	162	207
85	DACITE	PYRO FLOW BLOCK	S OF MORNE ANGLAIS	A		+	162	207
86	DACITE	PYRO FLOW BLOCK	MAGUA ESTATE	PLP		+	154	211
87	DACITE	DOME ROCK	E OF MN PLAT PAYS	PLP			150	209
88	ANDESITE	DOME ROCK	NE OF MN PLAT PAYS	PLP	+	+	152	209
89	ANDESITE	DOME ROCK	N OF MN PLAT PAYS	PLP	+	+	152	211
90	DACITE	MUDFLOW BLOCK	W OF MAGUA ESTATE	PLP	+	+	153	211
91	ANDESITE	PYRO FLOW BLOCK	NW OF MAGUA ESTATE	PLP			155	212
92	ANDESITE	LAVA FLOW	SE OF MORNE CANOT	PLP		+	153	215
93	ANDESITE	PYRO FLOW SAMPLE	E OF MORNE CANOT	PLP	P		155	215
94	ANDESITE	LAVA FLOW SAMPLE	UNION ESTATE	PLP		+	151	226
95	ANDESITE	LAVA FLOW	DEROCHELLE	PLP	+	+	150	228
96	DACITE	MUDFLOW	N OF L'HABITANT ES	PLP		+	149	224
97	ANDESITE	LAVA RUBBLE	CHAMPIGNY ESTATE	PLP			147	223
98	ANDESITE	LAVA FLOW	N OF S CHILTERN ES	PLP	+	+	146	223
99H	ANDESITE	PYRO FLOW BLOCK	N OF L'HABITANT ES	PLP	+	+	149	225
99X	DIORITE	PCBI XENOLITH	N OF L'HABITANT ES	PLP	+	+	149	225
100	DACITE	STRAT PYRO FLOW	W OF MORNE CABRITS	PLP	+	+	146	229
101	ANDESITE	BRECCIA WITH JASPER CEMENT	MORNE CABRITS	PLP		+	145	229
102	ANDESITE	REWORKED	PT GUIGNARD	PLP	+	+	143	229
103	ANDESITE	STRAT MUDFLOW	SW OF LA SOURCIERE	PLP	+	+	140	226
104	ANDESITE	STRAT MUDFLOW	LE GRAND MAISON	PLP			139	225
105	ANDESITE	STRAT MUDFLOW	LE GRAND MAISON	PLP		+	138	224
106	ANDESITE	AGGLOMERATE	NW OF SOUFRIERE	PLP	+	+	138	223
107	DACITE	LAVA FLOW (ALTERED)	NE OF SOUFRIERE	PLP	+	+	139	221
108	DACITE	LAVA FLOW	MORNE ACOUMA	PLP			141	220
109	ANDESITE	MUDFLOW	S OF HAGLEY	PLP	+	+	140	201
110	ANDESITE	LAVA RUBBLE	MONTINE	PLP	+	+	140	203
111	ANDESITE	MUDFLOW	MONTINE	PLP			141	203

SPEC SD	ROCK TYPE	OCCURRENCE	LOCALITY	CENTRE	ANAL	THIN	GRIDREF 61N	15W
112	ANDESITE	LAVA FLOW	MONTINE	PLP	S	+	141	204
113	ANDESITE	LAVA RUBBLE	MONTINE	PLP			141	202
114	ANDESITE	PYRO FLOW BLOCK	W OF GD COULIBRI	PLP	+	+	140	201
115	DACITE	LAVA RUBBLE	DALFONCIE	PLP	+	+	137	203
116	DACITE	PYRO FLOW BLOCK	N OF MORNE FOUS	PLP	+	+	130	206
117	ANDESITE	DOME ROCK	MORNE FOUS	PLP	+	+	125	207
118	ANDESITE	DOME ROCK	MORNE FOUS	PLP	+	+	125	207
119	DACITE	LAVA RUBBLE	SE OF PALMISTE	PLP	+	+	132	205
120	ANDESITE	LAVA BOULDER	SE OF PICHELIN	A?		+	154	197
121	ANDESITE	LAVA BOULDER	SE OF PICHELIN	A?		+	154	197
122	ANDESITE	MUDFLOW	W OF PICHELIN	A	+	+	157	205
123	DACITE	MUDFLOW	W OF PICHELIN	A			157	207
124	DACITE	MUDFLOW	NE OF MORNE CANOT	PLP			158	216
125	ANDESITE	MUDFLOW	NE OF MORNE CANOT	PLP	+	+	159	216
126	ANDESITE	LAVA FLOW	POWELL	PLP	+	+	140	203
127	ANDESITE	AIR FALL	TETE MORNE	PLP?			139	211
128	ANDESITE	STRAT MUDFLOW	HIGHLANDS ESTATE	PLP	+	+	152	221
129	DACITE	PYRO FLOW BLOCK	MT LOFTY ESTATE	PLP	+	+	151	214
130	ANDESITE	DOME SCREE	MT LOFTY ESTATE	PLP	+	+	150	214
131	ANDESITE	FRACT DOME ROCK	PETIT COULIBRI BAY	PLP	+	+	124	211
132	DACITE	FRACT DOME ROCK	PETIT COULIBRI BAY	PLP	+	+	125	209
133	DACITE	FRACT DOME ROCK	PETIT COULIBRI BAY	PLP	+	+	125	208
134	METASEDIMENT	ANDESITE XENOLITH	PETIT COULIBRI BAY	PLP	A	+	125	211
135	BASALT	BOULDERS IN GULLY	PETIT COULIBRI BAY	PLP?	+	+	125	211
136A	DACITE	PYRO FLOW BLOCK	S OF MORNE ROUGE	PLP	+	+	126	211
136B	BASALT	LAVA FLOW	N OF MN PAIX BOUCHE	F	+	+	156	164
137	BASALT	LAVA FLOW	N OF MN PAIX BOUCHE	F	+	+	157	164
138	BASALT	LAVA FLOW	N OF MN PAIX BOUCHE	F	+	+	157	164
139	ANDESITE	LAVA FLOW	NW MN PAIX BOUCHE	F	+	+	157	165
140	ANDESITE	LAVA FLOW	NW MN PAIX BOUCHE	F	+	+	157	165
141	BASALT	LOOSE LAVA BLOCK	NE SLOPES OF WAIWAI	F	+	+	147	166
142	BASALT	SCORIA	NE SLOPES OF WAIWAI	F	+	+	147	167
143	BASALT	LAVA FLOW	N SLOPES OF WAI WAI	F	+	+	147	166
144	ANDESITE	LAVA FLOW	N SLOPES OF WAI WAI	F	+	+	146	167
145	BASALT	LAVA FLOW	TOP OF WAI WAI	F	+	+	146	167
146	BASALT	STRATIFIED REWRKD	N SLOPES OF WAI WAI	F	+	+	147	168
147	ANDESITE	LAVA FLOW	N OF GALBA	F	+	+	151	169
148	BASALT	LAVA FLOW	SE FOUNDLAND	F	+	+	154	173

SPEC SD	ROCK TYPE	OCCURENCE	LOCALITY	CENTRE	ANAL	THIN	GRIDREF 61N	15W
149	BASALT	LAVA FLOW	SE FOUNDLAND	F	+	+	155	173
150	ANDESITE	LAVA FLOW	SE FOUNDLAND	F	+	+	155	174
151	BASALT	LAVA FLOW	SE FOUNDLAND	F	+	+	157	175
152	BASALT	LAVA FLOW	SE FOUNDLAND	F	+	+	156	175
153	BASALT	LAVA FLOW	SE FOUNDLAND	F	+	+	156	175
154	ANDESITE	LAVA FLOW	SE FOUNDLAND	F	+	+	157	173
155	ANDESITE	LAVA BOULDER	SE FOUNDLAND	F	+	+	157	171
156	ANDESITE	LAVA FLOW	MORNE TOUPIE	F	+	+	155	167
157	BASALT	LAVA FLOW	NE MN PAIX BOUCHE	F	+	+	160	160
158	BASALT	SCORIA	NE MN PAIX BOUCHE	F	+	+	158	160
159	BASALT	LAVA FLOW	NE MN PAIX BOUCHE	F	+	+	159	160
160	ANDESITE	REWORKED	PT MULATRE	GSH	+	+	165	158
161	DACITE	MUDFLOW	PT MULATRE	GSH	+	+	165	159
162	BASALT	LOOSE BLOCK LAVA	S OF PT MULATRE ES	F	+	+	160	163
163	BASALT	LAVA FLOW	UP SAVANE RIVER	F	+	+	159	178
164	ANDESITE	LAVA FLOW	UPPER SAVANE RIVER	F	+	+	158	178
165	DACITE	LAVA FLOW	UPPER SAVANE RIVER	F	+	+	158	177
166	ANDESITE	LAVA FLOW	UPPER SAVANE RIVER	F	+	+	157	176
167	BASALT	LAVA FLOW	UPPER SAVANE RIVER	F	+	+	157	176
168	BASALT	LAVA FLOW	UPPER SAVANE RIVER	F	+	+	156	176
169	BASALT	LAVA FLOW	UPPER SAVANE RIVER	F	+	+	156	175
170	GABBRO	STREAM BOULDER	UPPER SAVANE RIVER	F	N	+	155	175
171	BASALT	LAVA FLOW	UPPER SAVANE RIVER	F	+	+	155	175
172	GABBRO	STREAM PEBBLE	UPPER SAVANE RIVER	F	N	+	154	175
173	BASALT	LAVA FLOW	UPPER SAVANE RIVER	F	+	+	154	174
174	ANDESITE	LAVA FLOW	UPPER SAVANE RIVER	F	+	+	153	174
175	BASALT	LAVA FLOW	UPPER SAVANE RIVER	F	+	+	153	175
176	ANDESITE	LAVA FLOW	UPPER SAVANE RIVER	F	+	+	153	175
177	BASALT	THIN LAVA FLOW	PT RETIREAU	F	+	+	144	168
178	BASALT	THIN LAVA FLOW	PT RETIREAU	F	+	+	144	169
179	BASALT	LAVA FLOW	PT RETIREAU	F	+		145	170
180	BASALT	LAVA FLOW	RETIREAU BEACH	F	+	+	144	173
181	BASALT	AIR FALL	E OF FONT ST JEAN	F	+	+	144	174
182	BASALT	AIR FALL	E OF FONT ST JEAN	F	+		144	174
183	ANDESITE	MUDFLOW	BEAUBOIS ESTATE	A	+		171	225
184	BASALT	AIR FALL	GOMIER STEWART EST	A	+		168	218
185	BASALT	REWORKED	UPPER RIVER GILLON	A	+	+	166	219
186	BASALT	LAVA FLOW	UPPER RIVER GILLON	A	+	+	166	218

SPEC SD	ROCK TYPE	OCCURRENCE	LOCALITY	CENTRE	ANAL	THIN	GRIDREF 61N	15W
187	BASALT	LAVA FLOW	UPPER RIVER GILLON	A	+	+	166	217
188	BASALT	LAVA FLOW	UPPER RIVER GILLON	A	+	+	166	217
189	ANDESITE	MUDFLOW	UPPER RIVER GILLON	A	+	+	167	218
190	ANDESITE	MUDFLOW	UPPER RIVER GILLON	A	+	+	167	218
191	ANDESITE	AIR FALL	W GOMIER STEWART ES	A			169	222
192	DACITE	MUDFLOW	BEAUBOIS ESTATE	A			169	226
193	DACITE	LAVA FLOW	UPPER PICHELIN RIV	A?			162	199
194	DACITE	LAVA FLOW	UPPER PICHELIN RIV	A?	+	+	163	199
195	ANDESITE	THICK LAVA FLOW	UPPER PICHELIN RIV	A?	+	+	164	199
196	ANDESITE	REWORKED?	UPPER PICHELIN RIV	A?	S	+	165	198
197	ANDESITE	REWORKED?	UPPER PICHELIN RIV	W?	S	+	167	198
198	ANDESITE	PYRO FLOW BLOCK	E OF DURHAM ESTATE	A	+	+	175	211
199	BASALT	LOOSE BLOCK	NE OF DURHAM ESTATE	A	+	+	176	212
200H	ANDESITE	LOOSE BLOCK	NE OF DURHAM ESTATE	A	+	+	176	213
200X	DIORITE	XENOLITH IN BLOCK	NE OF DURHAM ESTATE	A	+	+	176	213
201	ANDESITE	PYRO FLOW PUMICE	MORNE BRUCE	M	+	+	178	232
202	ANDESITE	PYRO FLOW PUMICE	MORNE BRUCE	M	+	+	178	232
203	ANDESITE	PYRO FLOW BLOCK	MORNE BRUCE	M	+	+	178	232
204	DACITE	PYRO FLOW BLOCK	MORNE BRUCE	M	+	+	178	231
205	ANDESITE	PYRO FLOW BLOCK	E OF EMSALL ESTATE	M			180	227
206	DACITE	AIR FALL	E OF EMSALL ESTATE	M	+	+	180	228
207	DACITE	DOME ROCK	SUMMIT OF MN ANGLAIS	A	+	+	168	205
208	DACITE	DOME ROCK	SUMMIT OF MN ANGLAIS	A	+		168	205
209	DACITE	DOME ROCK	SUMMIT OF MN ANGLAIS	A			168	205
210	ANDESITE	LAVA FLOW	PETIT SAVANE BAY	F	+	+	149	162
211	GABBRO	XENOLITH IN LAVA	GALBA ROADCUT	F		+	151	171
212	NOT COLLECTED							
213	GABBRO	XENOLITH IN LAVA	GALBA ROADCUT	F		+	151	171
214	HORNBLENDITE	XENOLITH IN LAVA	GALBA ROADCUT	F		+	151	171
215	BASALT	SILL	N OF BAGATELLE EST	F	+	+	151	175
216	PEPERITE	MUD DYKE	N OF BAGATELLE EST	F	A	+	152	175
217	MYLONITE	FRACTURE PLANE ROCK	PETIT COULIBRI BAY	PLP	A	+	125	209
218	GABBRO	XENOLITH IN ANDESITE	MORNE ROUGE	PLP	N	+	125	211
219	DACITE	DOME ROCK	MORNE PLAT PAYS	PLP			150	209
220	DACITE	DOME ROCK	MORNE PLAT PAYS	PLP	+	+	150	210
221	DACITE	DOME ROCK	MORNE PLAT PAYS	PLP			151	211
222	DACITE	DOME ROCK	MORNE PLAT PAYS	PLP	+	+	151	211
223	ANDESITE	DOME ROCK	SOUFRIERE RIDGE	PLP	+	+	149	212

SPEC SD	ROCK TYPE	OCCURRENCE	LOCALITY	CENTRE	ANAL	THIN	GRIDREF 61N	15W
224	ANDESITE	PYRO FLOW BLOCK	BOIS D'INDE	PLP			139	195
225	DACITE	LAVA FLOW	BOIS D'INDE	PLP			138	195
226	DACITE	LAVA FLOW BLOCK	BOIS D'INDE	PLP	+	+	137	196
227	ANDESITE	LAVA FLOW	N OF PALMISTE	PLP	+	+	138	209
228H	ANDESITE	LAVA FLOW	N OF PALMISTE	PLP	+	+	138	209
228X	GABBRO	XENO IN LAVA FLOW	N OF PALMISTE	PLP	+	+	138	209
229	DACITE	LAVA FLOW	N OF PALMISTE	PLP			138	208
230	ANDESITE	LAVA FLOW	PALMISTE	PLP	+	+	136	209
231	DACITE	AIR FALL PUMICE	S OF PALMISTE	PLP	+		134	208
232	DACITE	LAVA FLOW BOULDER	S OF PALMISTE	PLP			132	208
233	DACITE	LAVA FLOW BOULDER	N OF PALMISTE	PLP	+		137	210
234	ANDESITE	LAVA FLOW BOULDER	N OF PALMISTE	PLP			137	209
235	DACITE	PYRO FLOW PUMICE	BEREKUA RAVINE	PLP			142	197
236	ANDESITE	REWORKED	BEREKUA RAVINE	PLP	+	+	142	196
237	BASALT	REWORKED	BEREKUA RAVINE	PLP		+	142	196
238	DACITE	PYRO FLOW SAMPLE	BEREKUA TARISH PIT	PLP	P		143	193
239	DACITE	PYRO FLOW SAMPLE	DEROCHELLE	PLP	P		149	230
240	DACITE	PYRO FLOW SAMPLE	N OF MORNE CABRITS	PLP			146	229
241	DACITE	PYRO FLOW SAMPLE	FOND SOPHIE	PLP			143	228
242	ANDESITE	PYRO FLOW BLOCK	FOND SOPHIE	PLP	+	+	143	228
243	ANDESITE	LAVA SCORIA	LA SORCIERE	PLP	+	+	141	225
244	ANDESITE	THICK LAVA FLOW	LA SORCIERE	PLP	+	+	141	225
245	DACITE	PYRO FLOW SAMPLE	RAVINE BLANCHE	PAT	P		128	224
246	DACITE	PYRO FLOW BLOCK	RAVINE BLANCHE	PAT	+	+	128	224
247	ANDESITE	FRACTURED DOME ROCK	NE OF MN PATATES	PAT	+	+	135	217
248	DACITE	AGGLOMERATE	GALLION	PAT	+	+	131	219
249	GABBRO	XENO IN LAVA FLOW	GALBA ROADCUT	F		+	151	171
250	GABBRO	XENO IN LAVA FLOW	GALBA ROADCUT	F	N	+	151	171
251	BASALT	LOOSE BOULDER	SW FOUNDLAND SLOPES	F			154	187
252	BASALT	SURFACE BOULDER	SW FOUNDLAND SLOPES	F	+	+	154	186
253	ANDESITE	WEATHERED BOULDER	SW FOUNDLAND SLOPES	F			157	183
254	ANDESITE	LAVA FLOW	SW FOUNDLAND SLOPES	F			158	183
255	ANDESITE?	WEATHERED BLOCK	SW FOUNDLAND SLOPES	F			158	182
256	ANDESITE	LAVA FLOW	SW FOUNDLAND SLOPES	F			159	181
257	BASALT	BOULDER ON RIDGE	SW FOUNDLAND SLOPES	F	+	+	159	180
258	ANDESITE	LAVA FLOW BOULDER	SW FOUNDLAND SLOPES	F	+	+	159	180
259	ANDESITE?	WEATHERED BLOCK	FOUNDLAND SUMMIT	F			160	179
260	ANDESITE	LAVA FLOW BOULDER	SW FOUNDLAND SLOPES	F			183	237

SPEC SD	ROCK TYPE	OCCURRENCE	LOCALITY	CENTRE	ANAL	THIN	GRIDREF 61N	15W
261	DACITE	PYRO FLOW PUMICE	GOODWILL QUARRY	M	+	+	183	237
262	DACITE	PYRO FLOW BLOCK	GOODWILL QUARRY	M	+	+	183	237
263	DACITE	PYRO FLOW PUMICE	GOODWILL QUARRY	M			183	237
264	DACITE	AIR FALL PUMICE	GOODWILL QUARRY	M	P		183	237
265	ANDESITE	AIR FALL PUMICE	GOODWILL QUARRY	M	P		183	237
266	DACITE	AIR FALL PUMICE	GOODWILL QUARRY	M	P		183	237
267	DACITE	AIR FALL	SE OF MORNE DANIEL	M			188	238
268	SAND	WATER LAIN	NW OF MORNE DANIEL	/			193	242
269	CORAL LMSTN	MARINE REEF	NW OF MORNE DANIEL	/		+	193	242
270	BASALT	LAVA BOULDER	E OF RIVER ESTATE	TP	+	+	193	233
271	BASALT	LAVA BOULDER	RIVER ESTATE	TP	+	+	191	231
272	DACITE	PYRO FLOW SAMPLE	RIVER ESTATE	TP			193	237
273	DACITE	PYRO FLOW PUMICE	RIVER ESTATE	TP			194	237
274	BASALT	LAVA FLOW	ROGER	TP			202	234
275	BASALT	LAVA FLOW	ROGER	TP	+	+	202	233
276	ANDESITE	LAVA FLOW	BEAUCLAIR ESTATE	TP	+	+	203	231
277	ANDESITE	LAVA BOULDER	BEAUCLAIR ESTATE	TP			204	230
278	BASALT	LAVA FLOW	SPRINGFIELD ESTATE	TP	+	+	204	229
279	BASALT	LAVA FLOW	SPRINGFIELD ESTATE	TP		+	204	230
280	ANDESITE	PYRO FLOW SAMPLE	S OF COCKRANE	TP			196	225
281	ANDESITE	PYRO FLOW BLOCK	S OF COCKRANE	TP			196	225
282	ANDESITE	PYRO FLOW XENO	S OF COCKRANE	TP		+	196	225
283	BASALT	LAVA FLOW	SPRINGFIELD ESTATE	TP	+	+	204	226
284	ANDESITE	PYRO FLOW BLOCK	CASTLETON ESTATE	TP	+	+	219	217
285	ANDESITE	PYRO FLOW BOULDER	SW OF PONT CASSE	TP	+		222	213
286	ANDESITE	PYRO FLOW SAMPLE	S OF BELLS	TP	P		250	210
287	ANDESITE	PYRO FLOW BLOCK	S OF BELLS	TP			250	210
288	ANDESITE	PYRO FLOW BLOCK	S OF BELLS	TP	+	+	250	210
289	ANDESITE	BLOCKY BASE OF P FLOW	MORNE BRUCE	M	+		178	231
290	ANDESITE	PYRO FLOW BASE SAMPLE	MORNE BRUCE	M	P		178	231
291	ANDESITE	AIR FALL SAMPLE	MORNE BRUCE	M	P		178	231
292	ANDESITE	AIR FALL SAMPLE	MORNE BRUCE	M	P		178	231
293	DACITE	AIR FALL SAMPLE	MORNE BRUCE	M	P		178	231
294	ANDESITE	AIR FALL SAMPLE	MORNE BRUCE	M	P		178	231
295	GRAVEL	REWORKED	MORNE BRUCE	/			178	231
296	SAND	REWORKED	MORNE BRUCE	/			178	231
297	DACITE	PYRO FLOW BASE	ST AROMANT ESTATE	M			181	230
298A	LIMESTONE	CORAL REEF	MORNE DANIEL	/	A		193	242

SPEC SD	ROCK TYPE	OCCURRENCE	LOCALITY	CENTRE	ANAL	THIN	GRIDREF 61N	15W
298B	ANDESITE	COMPACTED PYRO FLOW	W OF MORNE LOUIS	M			182	225
299	ANDESITE	WELDED PYRO FLOW	S OF FOND CANI	M			185	219
300	BASALT	AIR FALL	S OF ROBINSON EST	W	P		182	202
301	DACITE	LAVA FLOW SCREE	S OF ROBINSON EST	W	+	+	181	201
302	ANDESITE	LAVA FLOW	SE OF SPRINGFIELD ES	TP			205	226
303	DACITE	PYRO FLOW BLOCK	NE OF PONT CASSE	TP			266	230
304	DACITE	PYRO FLOW BLOCK	NNE OF MN TROIS PITONS	TP	+	+	232	197
305	DACITE	PYRO FLOW BLOCK	NNE OF MN TROIS PITONS	TP			232	194
306	DACITE	PYRO FLOW BLOCK	TROIS PITONS TARISH PT	TP	+	+	231	193
307	DACITE	PYRO FLOW BLOCK	TROIS PITONS TARISH PT	TP		+	231	193
308	DACITE	PYRO FLOW SAMPLE	TROIS PITONS TARISH	TP	P		231	193
309	ANDESITE	AIR FALL	TROIS PITONS TARISH	TP	+	+	231	193
310	ANDESITE	PYRO FLOW BLOCK	EMERALD POOL	TP			238	195
311	ANDESITE	PYRO FLOW SAMPLE	EMERALD POOL	TP	P		238	195
312	ANDESITE	RIVER BOULDER	SE OF CASTLE BRUCE	ECV	+	+	255	172
313	ANDESITE	RIVER BOULDER	SE OF CASTLE BRUCE	ECV		+	255	172
314	BASALT	PYRITE ROCK	SE OF CASTLE BRUCE	ECV	S	+	255	172
315	ANDESITE	RAFT IN PYRITE RK	SE OF CASTLE BRUCE	ECV	S	+	255	172
316	ANDESITE	LAVA FLOW BOULDER	SE OF TROU COCHON	TP?	S	+	227	173
317	ANDESITE	RIVER BOULDER	ROSALIE RIVER	TP?	S	+	222	168
318	BASALT	RIVER BOULDER	ROSALIE RIVER	TP?	S	+	222	168
319	BASALT	RIVER BOULDER	ROSALIE RIVER	TP?	+	+	222	168
320	JASPER	RIVER BOULDER	ROSALIE RIVER	TP?			222	168
321	ANDESITE	LAVA FLOW	W OF ROSALIE	ECV			222	162
322	ANDESITE	LAVA FLOW	W OF ROSALIE	ECV	+	+	222	161
323	ANDESITE	PYRO FLOW BLOCK	BELLEVUE RAV EST	M		+	184	224
324	ANDESITE	PARTIALLY WELDED PYRO	FLOW BELLEVUE	M			184	224
325	ANDESITE	AIR FALL	COPT HALL ESTATE	M			183	222
326	ANDESITE	MUDFLOW	SE OF FOND CANI	M			186	222
327	ANDESITE	LAVA FLOW	HUNTINGDON INLIER	M	S	+	189	216
328	DACITE	RIV PEBBLE WELDED TUFF	ROSEAU RIVER	M		+	188	218
329	ANDESITE	RIV PEBBLE WELDED TUFF	ROSEAU RIVER	M			188	218
330	ANDESITE	LAVA FLOW	HUNTINGDON INLIER	M	+	+	189	217
331	DACITE	LAVA FLOW	HUNTINGDON INLIER	M	S		188	214
332	CALCITE	RIVER BOULDER	HUNTINGDON INLIER	/	A	+	189	213
333	ANDESITE	LAVA FLOW	HUNTINGDON INLIER	M?	+	+	189	211
334	ANDESITE	LAVA FLOW	HUNTINGDON INLIER	M?		+	190	211
335	DACITE	PYRO FLOW BLOCK	HUNTINGDON INLIER	M?			190	210

SPEC SD	ROCK TYPE	OCCURRENCE	LOCALITY	CENTRE	ANAL	THIN	GRIDREF 61N	15W
336	DACITE	PYRO FLOW BLOCK	HUNTINGDON INLIER	M?	+	+	190	210
337	ANDESITE	LAVA FLOW	BOERI RIVER INLIER	TP			189	226
338	ANDESITE	LAVA FLOW	BOERI RIVER INLIER	TP			189	224
339	ANDESITE	REWORKED	BOERI RIVER INLIER	TP	+	+	189	224
340	ANDESITE	LAVA FLOW	BOERI RIVER INLIER	TP			190	223
341	ANDESITE	P FLOW WELDED FINES	ALFORD ESTATE	A			159	215
342	ANDESITE	PYRO FLOW BLOCK	ALFORD ESTATE	A	+	+	159	215
343	DACITE	AIR FALL PUMICE	ALFORD ESTATE	A?			158	215
344A	ANDESITE	LAVA SCORIA	SE OF MORNE CANOT	PLP	+		154	216
345	DACITE	PYRO FLOW SAMPLE	MA ROBERT	M	P		218	158
346	DACITE	PYRO FLOW PUMICE	MA ROBERT	M			218	158
347	DACITE	PYRO FLOW BLOCK	MA ROBERT	M		+	218	158
348	DACITE	AIR FALL	S OF MA ROBERT	M	P		217	159
349	LATERITE	AIR FALL	RIVIERE CIRIQUES	M			214	159
350	LATERITE	AIR FALL	RIVIERE CIRIQUES	M			214	159
351	ANDESITE	COMPACTED AIR FALL	MORNE AUX FREGATES	M			212	161
352	ANDESITE	LAVA FLOW	TABERI ESTATE	M			205	156
353	BAUXITE	WEATHERED AIR FALL	TABERI ESTATE	/	A		205	156
354	ANDESITE	LAVA FLOW	BIBIAY	M			206	155
355	BAUXITE	SURFACE COATING	LATERITE S OF BIBIAY	/	A		204	154
356	DACITE	PYRO FLOW BLOCK	COROSSOL	GSH	+	+	202	153
357	DACITE	PYRO FLOW SAMPLE	S OF LA PLAINE	GSH	P		190	153
358H	DACITE	PYRO FLOW BLOCK	S OF LA PLAINE	GSH	+	+	190	153
358X	DIORITE	PYRO FLOW XENO	S OF LA PLAINE	GSH	+	+	190	153
359	DIORITE	PYRO FLOW XENO	S OF LA PLAINE	GSH		+	190	153
360	DACITE	PYRO FLOW BLOCK	LA GENGETTE ESTATE	GSH	+	+	187	154
361	BASALT	RIVER BOULDER	PT MULATRE R MOUTH	F	+	+	164	161
362	ANDESITE	RIVER BOULDER	PT MULATRE R MOUTH	F	+	+	164	161
363	ANDESITE	RIVER BOULDER	PT MULATRE R MOUTH	F			164	161
364	PEPERITE	RIVER BLOCK	SAVANE RIVER	F			152	173
365	PEPERITE	RIVER BLOCK	SAVANE RIVER	F			152	173
366-376	INC. PLUTONIC NODULES		SAVANE RIVER	F	N	+	152	173
377	DACITE	AIR FALL (ALT)	LAUDAT	M			199	205
378	DACITE	DOME SCREE	LAUDAT	M			200	205
379	DACITE	PYRO FLOW BLOCK	SANDRINGHAM ESTATE	M	+		195	201
380	DACITE	AIR FALL (ALT)	SPRINGHILL ESTATE	M			198	211
381	DACITE	AIR FALL (ALT)	DEUX GRANGES	M			194	218
382	ANDESITE	MUDFLOW	DEUX GRANGES	M	+	+	193	219

SPEC SD	ROCK TYPE	OCCURRENCE	LOCALITY	CENTRE	ANAL	THIN	GRIDREF 61N	15W
384,385	NOT COLLECTED							
385	DACITE	DOME ROCK	MORNE WATT	W	+	+	184	187
386	LEACHED ROCK		VALLEY OF DESOLATION	/	A		187	185
387	FUMAROLIC SUBLIMATE		VALLEY OF DESOLATION	/			187	185
388	FUMAROLIC SUBLIMATE		VALLEY OF DESOLATION	/			187	185
389	FUMAROLIC SUBLIMATE		VALLEY OF DESOLATION	/			187	185
390	ANDESITE		VALLEY OF DESOLATION	/		+	187	183
391	GABBRO	DOME XENOLITH	MORNE ESPAGNOL	D		+	314	286
392H	DACITE	DOME ROCK	MORNE ESPAGNOL	D	+	+	314	286
392X	GABBRO	DOME XENOLITH	MORNE ESPAGNOL	D	+	+	314	286
393	DACITE	DOME ROCK SCREE	MORNE ESPAGNOL	D		+	314	286
394	BASALT	LAVA FLOW	COLIHAUT RIVER	D		+	290	280
395	ANDESITE	LAVA FLOW	COLIHAUT RIVER	D			290	280
396	ANDESITE	LAVA FLOW	N OF COULIBISTRI	D	+	+	275	277
397	CHARCOAL	CARBONISED TREE	GOODWILL QUARRY	/			183	237
398	LIMESTONE	LAGOONAL ALGAL LMST	TAMERIN COUCHE	/	A		277	278
399D	ANDESITE	BANDED PYRO FLOW PUMICE BLOCK	LAYOU	TP	+	+	237	260
399L	DACITE	BANDED PYRO FLOW PUMICE BLOCK	LAYOU	TP	+	+	237	260
400	ANDESITE	PILLOW LAVA	N OF MASSACRE	TP			211	242
401	ANDESITE	PILLOW LAVA RIM	N OF MASSACRE	TP			211	242
402	ANDESITE	PILLOW LAVA RIM	N OF MASSACRE	TP		+	211	242
403	PALAGONITE	PILLOW LAVA RIM	N OF MASSACRE	TP	A		211	242
404	ANDESITE	LAVA FLOW BRECCIA	TAROU POINT	TP	+	+	226	253
405	ANDESITE	LAVA FLOW BRECCIA	TAROU POINT	TP		+	226	253
406	ANDESITE	LAVA FLOW BRECCIA	TAROU POINT	TP	+	+	222	253
407-425	INCLUSIVE	PLUTONIC NODULES FROM THE SAVANE RIVER		F	SOME		152	174
426	TO	LAVA FLOWS +	TRAVERSE OF NE	F	N	FROM	145	167
449	INC.BASALTS	LAVA BRECCIAS	SLOPES OF WAI WAI	F	SOME	TO	147	164
450	BASALT	SILL	N OF BAGATELLE EST	F			151	175
451	BASALT	SILL	N OF BAGATELLE EST	F	+	+	150	174
452	ANDESITE	WELDED BASE OF PYRO FLOW AT	TRAFALGAR	M		+	194	204
453	GABBRO	XENOLITH IN LAVA	PT TANAMA	PLP		+	134	195
454	CALCITE	GROUNDWATER PRECIP	PAPILLIOT	/	A		194	208
455	CALCITE	GROUNDWATER PRECIP	PAPILLIOT	M			194	208
456	DACITE	WELDED PYRO FLOW	PAPILLIOT	M			195	207
457	ANDESITE	SURFACE BOULDER	FRESHWATER LAKE	M		+	204	190
458	DACITE	WELDED PYRO FLOW	FRESHWATER LAKE	M			205	191
459	ANDESITE	PYRO FLOW BLOCK	FRESHWATER LAKE	M	+	+	205	191

SPEC SD	ROCK TYPE	OCCURRENCE	LOCALITY	CENTRE	ANAL	THIN	GRIDREF 61N	15W
460	ANDESITE	DOME SCREE	NW OF FRESHWATER LK	M			207	192
461H	DACITE	DOME SCREE	S OF BOERI LAKE	M	+		208	198
461X	GABBRO	XENOLITH	S OF BOERI LAKE	M	+	+	208	198
462	GABBRO	XENOLITH IN LAVA	S OF BOERI LAKE	M		+	208	198
463	ANDESITE	DOME SCREE	S MN TROIS PITONS	TP			210	197
464	ANDESITE	DOME SCREE	S MN TROIS PITONS	TP	+	+	210	196
465	ANDESITE	LAVA FLOW REMNANT	BOERI LAKE	M	+	+	209	195
466	ANDESITE	DOME SCREE	SE OF BOERI LAKE	M			209	194
467	ANDESITE	LOOSE BOULDER	NW OF FRESHWATER LK	M			207	193
468	ANDESITE	DOME SCREE	S MICOTRIN DOME	M			198	197
469	DACITE	DOME SCREE	S MICOTRIN DOME	M	+	+	198	197
470	DACITE	DOME SCREE	S MICOTRIN DOME	M			198	197
471	ANDESITE	DOME SCREE	S MICOTRIN DOME	M	+	+	198	197

APPENDIX 1:2

MODES AND PHENOCRYST PROPORTIONS.

Modal analyses were made with a Swift point-counter; normally over 3,000 points were counted at $^{1}/_{3}$mm intervals. This represents an area of 300mm^2, approximately the area of one thin section. Average phenocryst sizes are generally less than 10mm^2, so one large phenocryst may represent as much as 3% of the mode. Clearly the accuracy of this method of modal analysis depends upon the representativeness of any random section. This will increase as the grain size decreases. Great accuracy is not claimed for these modal analyses, nevertheless the data are considerably better than guesses, and represent the best quantitative information available. The phenocryst proportions have been calculated by normalising to 100 without the groundmass. They are intended to be used for comparison with the plutonic nodule modes. The following abreviations are explained:

PLAG = plagioclase

AMPH = amphibole

ORPX = orthopyroxene

CLPX = clinopyroxene

OLIV = olivine

MAGN = magnetite

QUTZ = quartz

GDMS = groundmass

S.DOMINICA VOLCANICS - APENDIX 1.2 - MODES & PHENOCRYST PROPORTIONS

	SD1	SD4	SD9	SD11	SD25	SD37	SD47	SD54	SD61	SD63
PERCENT										
PLAG	36.30	27.90	37.10	35.30	35.70	26.20	38.20	38.10	34.30	31.00
AMPH	1.30	2.50	1.90	2.90	0.00	0.00	1.70	0.00	0.00	0.00
CRPX	4.70	8.90	4.60	6.50	5.90	1.40	4.40	0.70	5.40	5.40
CLPX	2.70	2.70	1.80	1.30	0.20	1.60	1.40	2.40	3.30	2.90
CLIV	0.00	0.00	0.00	0.00	0.00	2.10	0.00	2.20	0.60	1.00
MAGN	1.20	1.60	2.00	4.00	1.40	1.40	1.60	1.50	1.10	1.80
QUTZ	0.40	0.00	0.00	0.00	3.60	0.00	0.00	0.00	0.00	0.00
GDMS	53.30	56.40	52.60	54.50	53.20	67.30	52.70	56.80	55.30	58.90
PHEN PROP										
PLAG	77.90	64.00	78.30	77.50	76.30	80.10	80.70	88.10	76.70	73.10
AMPH	2.80	5.70	4.00	2.90	0.00	0.00	3.60	1.60	0.00	0.00
CRPX	10.10	20.40	9.70	14.30	12.60	4.30	9.30	2.00	12.10	13.10
CLPX	5.70	6.20	3.80	1.30	0.40	4.90	3.00	5.60	7.40	7.00
CLIV	0.00	0.00	0.00	0.00	0.00	6.40	0.00	5.10	1.30	2.40
MAGN	2.60	3.70	4.20	4.00	3.00	4.30	3.40	1.20	2.50	4.40
QLTZ	0.90	0.00	0.00	0.00	7.70	0.00	0.00	0.40	0.00	0.00

S.DOMINICA VOLCANICS - APENDIX 1.2 - MODES & PHENOCRYST PROPORTIONS

	SD72	SD135	SD139	SD140	SD150	SD152	SD156	SD159	SD164	SD165
PERCENT										
PLAG	30.60	38.80	31.60	32.30	38.10	33.50	34.00	30.10	27.40	30.80
AMPH	1.30	0.00	0.00	0.00	0.00	0.00	0.00	0.00	2.90	1.10
ORPX	8.00	1.30	2.90	1.50	7.90	2.10	6.30	3.40	3.50	3.60
CLPX	3.20	7.20	1.00	2.40	6.70	4.40	4.20	2.20	1.90	1.30
OLIV	0.00	2.10	0.60	1.30	0.30	0.60	0.30	0.20	0.00	0.10
MAGN	2.10	2.50	0.80	1.30	2.70	1.40	1.40	1.90	1.50	1.70
QUTZ	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.30	0.80
GDMS	54.90	48.10	63.10	62.00	44.40	58.10	53.80	62.20	62.50	60.60
PHEN PROP										
PLAG	67.60	74.80	85.70	85.10	68.50	79.80	73.70	79.70	73.20	78.60
AMPH	2.90	0.00	0.00	0.00	0.00	0.00	0.00	0.00	8.10	2.70
ORPX	17.70	2.50	7.90	3.90	14.40	5.00	13.60	9.00	9.70	4.30
CLPX	7.10	13.90	2.70	6.30	12.10	10.50	9.10	5.80	5.20	3.20
OLIV	0.00	4.00	1.60	1.30	0.30	1.40	0.60	0.50	0.00	0.10
MAGN	4.70	4.80	2.10	3.40	4.90	3.30	3.00	5.00	3.00	3.20
QUTZ	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.80	2.00

S.DOMINICA VOLCANICS - APENDIX 1.2 - MODES & PHENOCRYST PROPORTIONS

	SD169	SD173	SD174	SD180	SD188	SD207	SD215	SD223	SD278	SD358
PERCENT										
PLAG	32.90	34.50	33.10	36.70	38.10	32.90	38.50	29.30	26.00	33.10
AMPH	0.00	0.00	0.00	0.00	0.00	0.70	0.00	1.20	0.00	0.20
ORPX	6.10	1.90	3.20	0.00	0.10	4.60	0.00	5.40	0.90	3.50
CLPX	3.40	2.40	6.20	3.60	4.60	0.80	0.30	3.90	3.00	1.60
OLIV	1.50	1.50	0.10	6.30	4.20	0.00	7.70	0.00	3.20	0.00
MAGN	2.30	1.60	2.70	0.30	1.60	1.20	0.10	2.00	0.40	5.10
QUTZ	0.00	0.00	0.00	0.00	0.00	0.60	0.00	0.00	0.00	0.00
GDMS	53.80	58.10	54.70	53.10	51.40	59.20	53.40	58.20	66.50	56.50
PHEN PROP										
PLAG	71.20	82.40	73.10	78.30	78.50	80.60	82.80	70.10	77.50	76.20
AMPH	0.00	0.00	0.00	0.00	0.00	1.70	0.00	2.90	0.00	0.40
ORPX	13.20	4.50	7.10	0.00	0.20	11.30	0.00	12.80	2.70	8.00
CLPX	7.40	5.70	13.60	7.70	9.50	2.00	0.60	9.30	9.00	3.70
OLIV	3.20	3.60	0.20	13.40	8.60	0.00	16.50	0.00	9.60	0.00
MAGN	5.00	3.80	6.00	0.60	3.20	2.90	0.10	4.90	1.20	11.70
QUTZ	0.00	0.00	0.00	0.00	0.00	1.50	0.00	0.00	0.00	0.00

S.DOMINICA VOLCANICS - APENDIX 1.2 - MODES & PHENOCRYST PROPORTIONS

	SD385	SD435	SD440	SD451	SD464	SD469
PERCENT						
PLAG	30.50	42.30	32.20	37.90	28.70	29.80
AMPH	1.10	0.00	0.00	0.00	0.40	1.90
ORPX	4.20	0.50	0.20	0.00	5.60	4.60
CLPX	0.60	1.60	7.90	0.40	2.70	1.90
OLIV	0.00	6.20	5.10	9.10	0.00	0.10
MAGN	1.30	0.20	1.50	0.30	2.30	0.60
QUTZ	0.20	0.00	0.00	0.00	0.10	0.70
GDMS	62.10	49.20	53.10	52.30	60.20	60.40
PHEN PROP						
PLAG	80.50	83.40	68.60	79.60	72.10	75.30
AMPH	2.90	0.00	0.00	0.00	1.00	4.80
ORPX	11.10	1.00	0.40	0.00	14.10	11.60
CLPX	1.60	3.10	16.80	0.80	6.80	4.80
OLIV	0.00	12.20	10.80	19.00	0.00	0.20
MAGN	3.40	0.30	3.20	0.60	5.80	1.50
QUTZ	0.50	0.00	0.00	0.00	0.20	1.80

APPENDIX 1:3

X-RAY FLUORESCENCE ANALYSIS - TECHNIQUES AND CONDITIONS

Specimen Preparation

Specimens selected for analysis were split into conveniently sized fragments less than 5cm using a Cutrock Engineering hydraulic splitter. Weathered surfaces were excluded. Over 500gm of material was used for all the consolidated volcanics, but less was available for the sorted pyroclastics and some of the plutonic nodules. The fragments were broken into a coarse gravel using a Sturtevant 2" x 6" Roll Jaw Crusher, and then reduced to 50-150gm by taking $^{1}/2$, $^{1}/4$, or $^{1}/8$ fractions. Composite specimens were carefully reduced to their separate fractions at this stage.

These fractions were then ground for 3-4 minutes to a fine powder, using a Tema Laboratory Disc Mill, model T-100 with a tungsten-carbide Widia grinding barrel. A representative sample of a few grams was withdrawn for the FeO determination after 30 seconds. This was taken in order to avoid additional oxidation during grinding as described by Fitton and Gill (1970).

The Durham University Department of Geological Sciences uses a compressed-powder bricquette procedure for major and trace element analysis. This is largely due to the great saving in time compared to fusion techniques. The powders were compressed into briquettes with a hydraulic press operating at 5-6 tons/sq.in, (800-900 Kg/cm^2). A few drops of Mowiol were used as an inert organic binding agent.

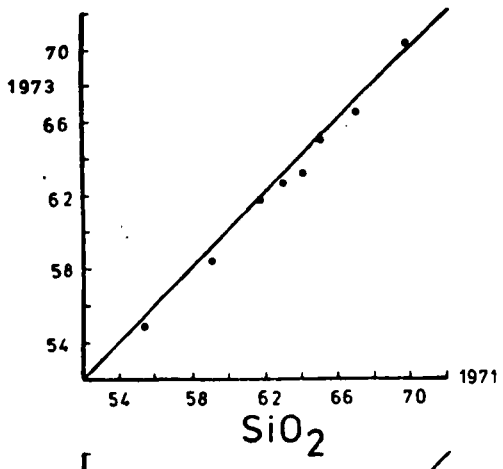
Major Element Analysis

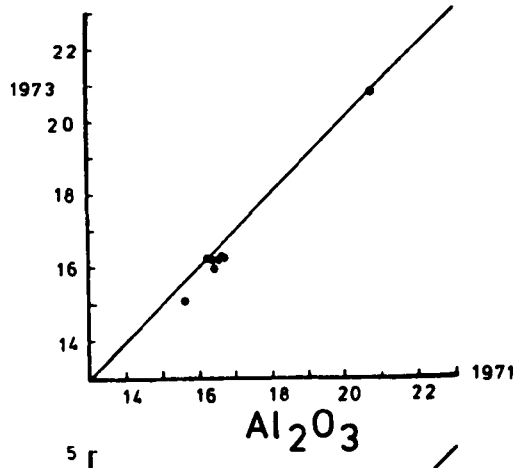
The analyses were carried out on a Phillips PW1212 automatic spectrometer. The 1971 specimens were loaded manually, but in 1973 the procedure was speeded up after the introduction of a Torrens Industries TE108 Automatic Sample Loader. The routine operating conditions are given by Reeves (1971), but some details are given here. The elements Si, Al, Fe, Mg, Ca, Na, K, Ti, P and S were determined using a Cr target and an evacuated X-ray path. Mn was determined separately using a W target.

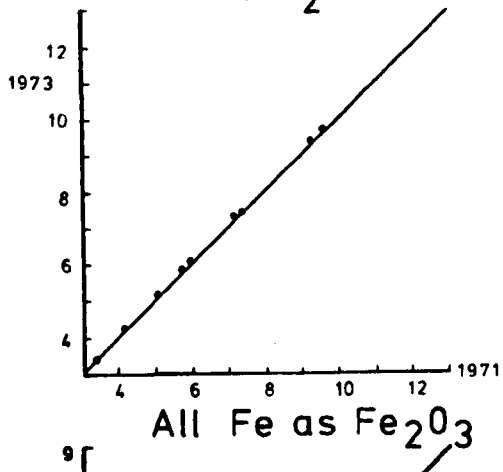
In order to minimise systematic and random errors due to electronic instability etc., the method of "fixed counts" was used, together with a monitor for the major elements. In this method the time (T) taken to accumulate a pre-determined 'N' counts on a monitor is automatically recorded. The next three samples are then counted over the same time interval (T) for the same element,and hence an allowance is made for possible drift in the count rate as detected by the monitor.

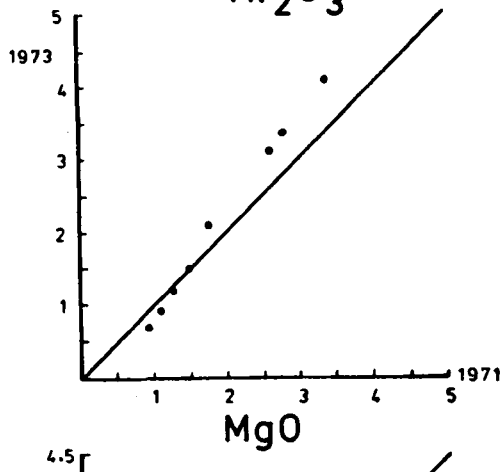
Standards used were the international standards G1, G2, W1, T1, S1, GR, GA, AGV1, GSR1, BCR1 and wet chemically analysed Grenada and Dominica samples covering the range of compositions present on the island. The latter analyses were made at the Seismic Research Unit, U.W.I., Trinidad. The calibration curves for counts versus stated composition of the Antill es samples compare well with the International standards. The compositions of the international standards taken were those from reviews by Flanagan (1969, 1973).

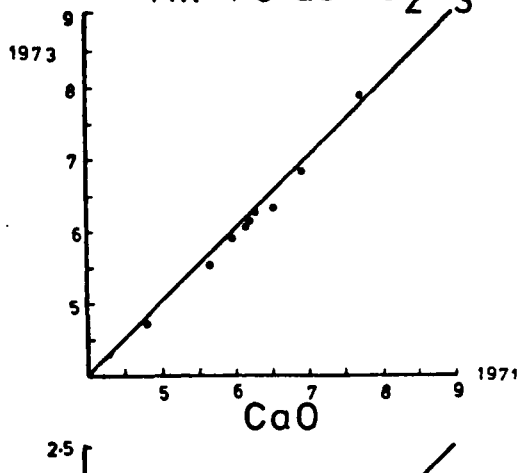
The analytical data were corrected for mass absorption differences between standards and unknowns by an iterative computer procedure as

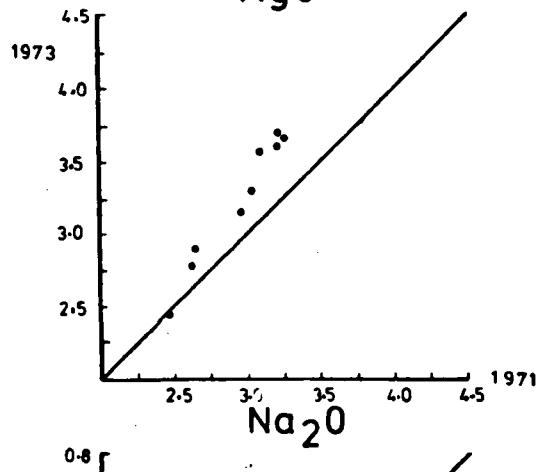


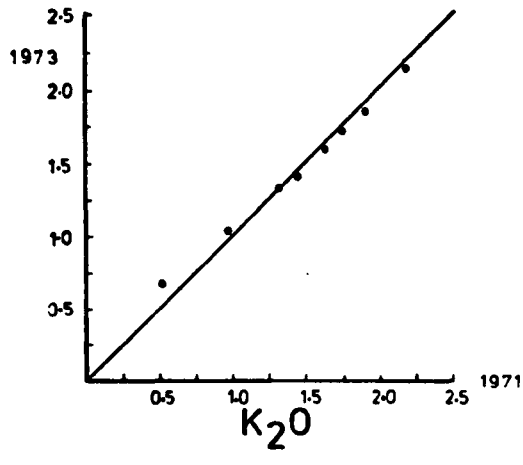


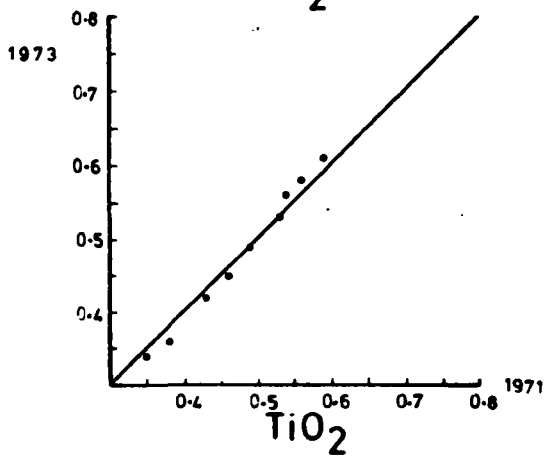










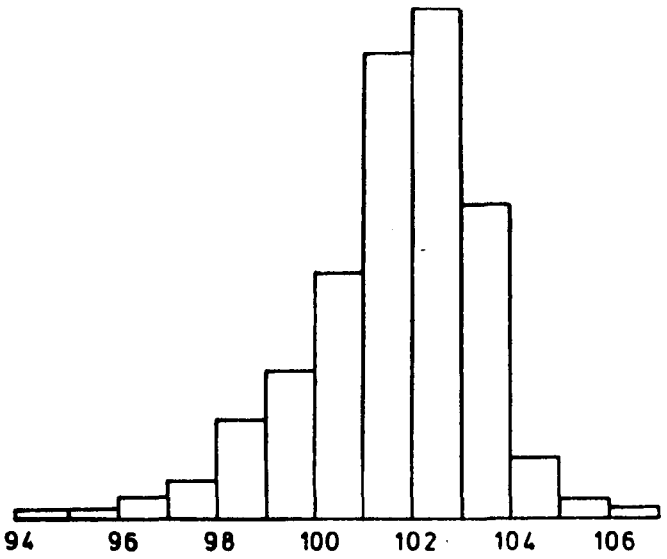


Appendix Fig. 1.1. Comparison of 1971 and 1973 X.R.F. analyses of the same specimens. (values in wt%, lines slope at 45°)

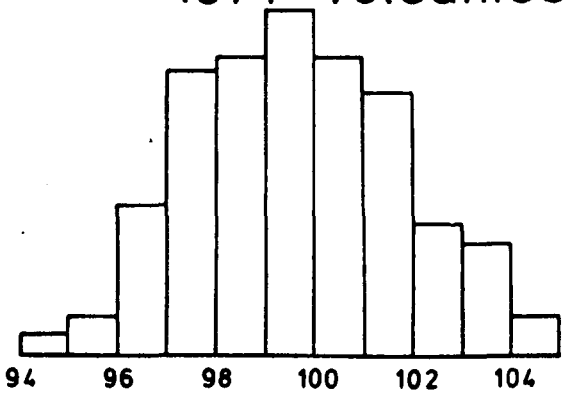
described by Holland and Brindle (1966) and Reeves (1971). All Fe is expressed as Fe_2O_3 in these analyses. Internal consistency is extremely good, some 1971 analyses were repeated in 1973, and are compared in appendix fig. 1.1.

This procedure depends considerably on a normalisation of the analyses to 100% in order to produce realistic analyses. It is therefore open to much criticism, and one cannot expect these analyses to be used in international computer libraries such as CLAIR, described by Le Maitre (1973). Gill (1972) has described these problems in detail, but concludes that the errors introduced by the Holland-Brindle method are not significant for rocks with low-iron content (less than 11%).

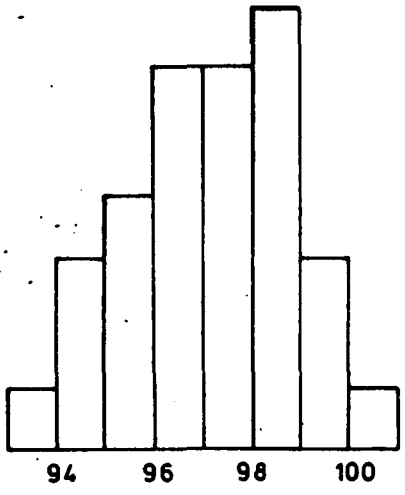
In appendix fig. 1.2, histograms are shown of the analysis totals after application of the mass absorption correction but before normalisation. It can be seen that there is significantly greater variation than would be acceptable from wet-chemical methods, and neither the mean nor the mode of the distributions coincide exactly with 100%. The mean of the 1971 totals is particularly high at 102%. This problem was better understood in 1973, and calibration curves of counts versus composition were constructed in order to reject those standards which did not follow the general trend. As a result the mean of the 1973 analyses is between 99 and 100%. The mean of the plutonic specimens totals, analysed at the same time is between 97 and 98%, this difference is no doubt due to the presence of up to 3% volatiles in the plutonic specimens. These values have also been normalised to 100% so that calculations between possible liquid and crystal-extract compositions can



1971 Volcanics

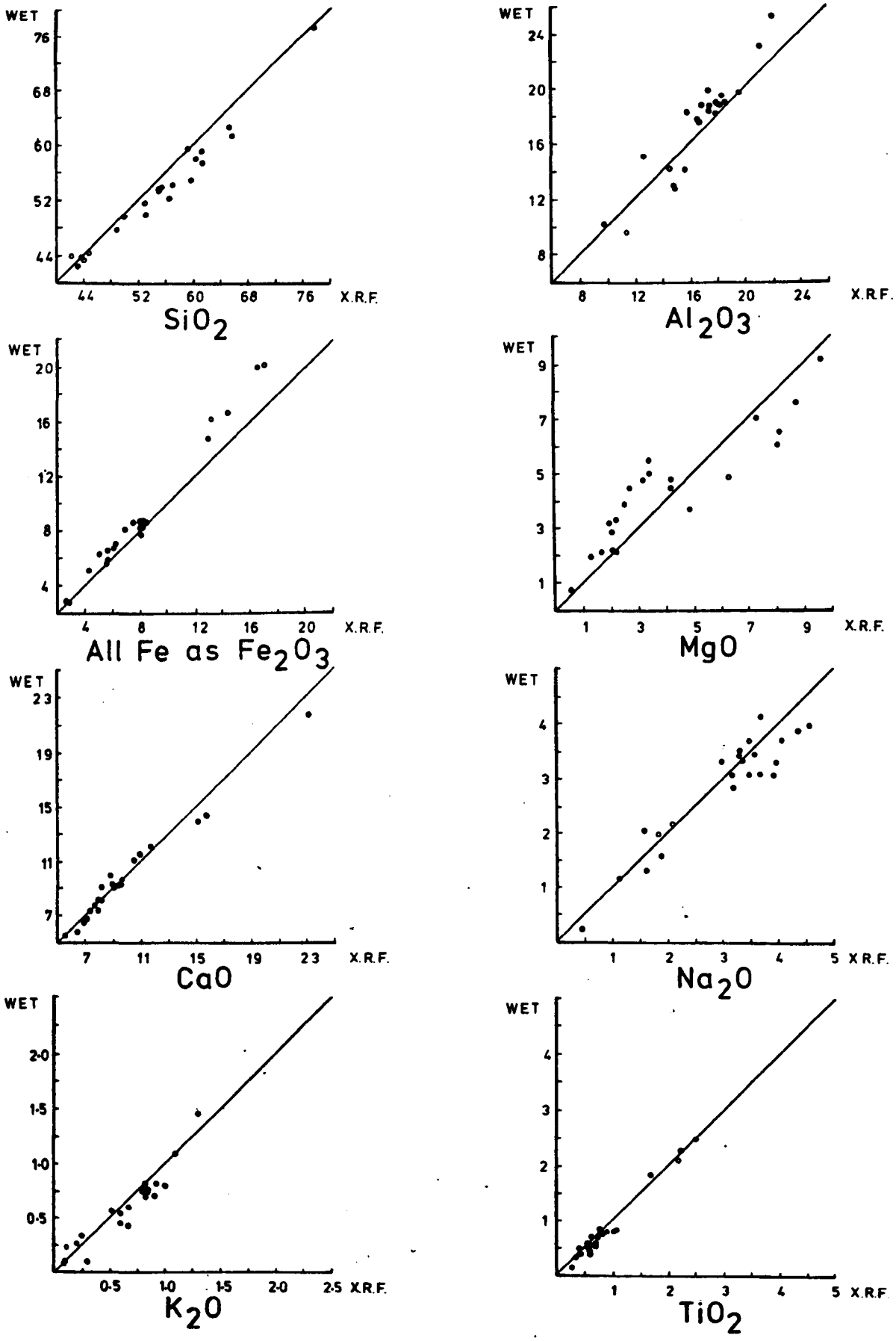


1973 Volcanics



1973 Plutonics

Appendix Fig.1·2. Frequency distribution of X.R.F. analysis totals before normalisation.



Appendix Fig.1-3. Comparison of X.R.F. and wet chemical analyses of the same specimens.

X.R.F. analyses at Durham, wet chemical analyses by Rea(1970)=• and Walsh(pers. comm)=•
(Values in wt%, lines slope at 45°)

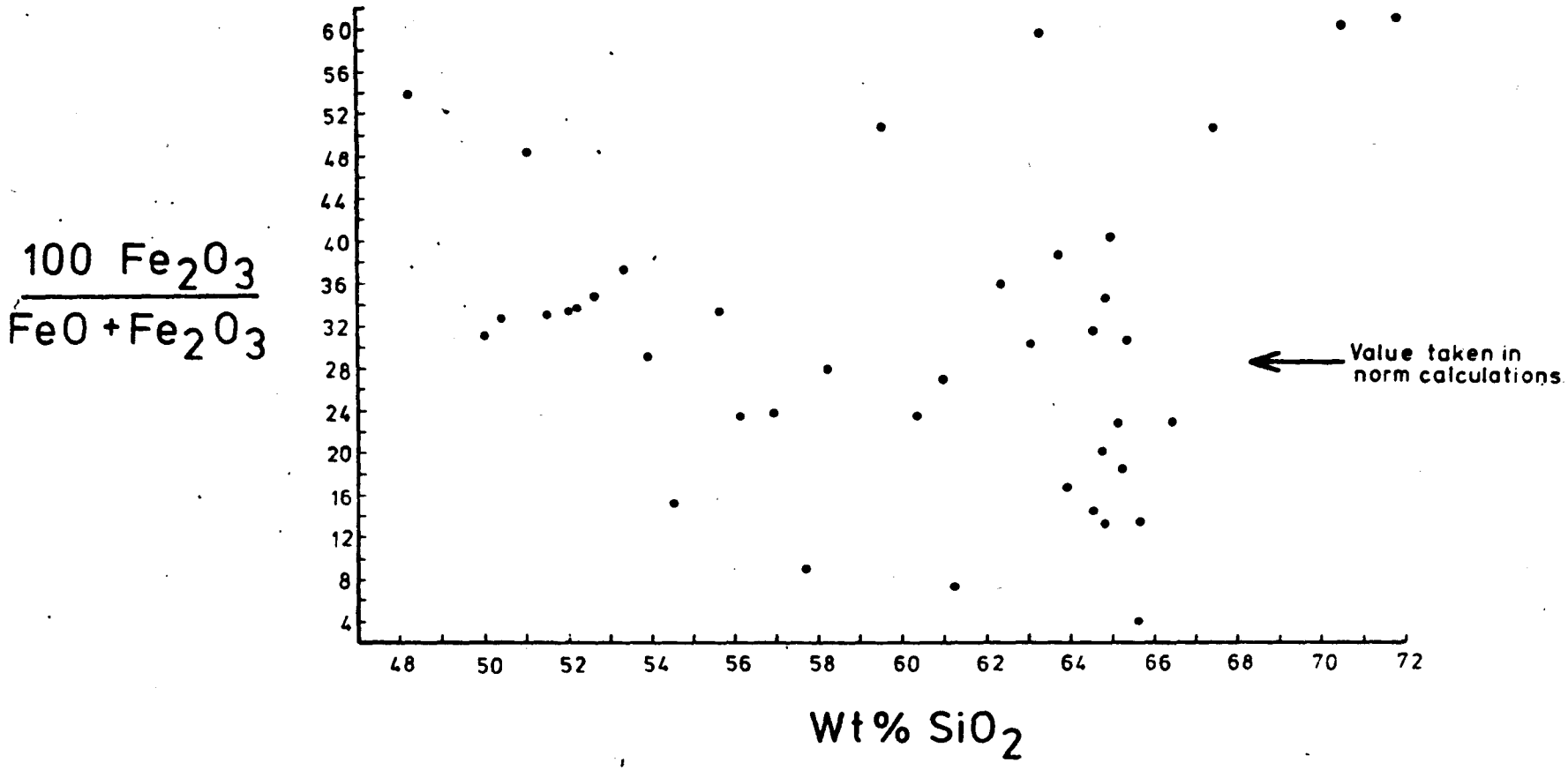
be made.

In order to gain some idea of the variations between the X.R.F. and wet chemical analyses, some data has been gathered from specimens which have been analysed by both methods. Such specimens are described by Rea (1970, p.121) and are listed in his appendix table 3. A few duplicate analyses were also available to the writer from some joint work with Dr N. Walsh of King's College, London on some rocks from Ardnamurchan. For comparison the wet-chemical analyses have been recalculated to 100% volatile free, and are plotted against the X.R.F. analyses in appendix Fig. 1.3. The comparison is good for most elements, but in the X.R.F. analyses SiO_2 tends to be too high, whilst Fe_2O_3 and MgO are slightly low. This discrepancy of silica is the most problematical as the rocks are classified on their SiO_2 content. The divisions between basalt and andesite etc. in Dominica have been taken at slightly higher values than normal to allow for this (see Chapter 5).

Despite these difficulties, the method described is useful because large numbers of analyses are readily completed. In particular, the variation between centres, and in different size fractions of unconsolidated pyroclastics, would not have been appreciated without these techniques.

Wet Chemical Analysis for FeO and H_2O.

About 50 specimens were analysed for FeO wet chemically by the metavanadate method (Wilson, 1955). For the freshest rocks, the oxidation ratio $100\ Fe_2O_3/FeO + Fe_2O_3$ is plotted against SiO_2 in appendix fig. 1.4. As anticipated, there is considerable random



Appendix Fig.1.4. Plot of wt% SiO_2 versus oxidation ratio in 'fresh' Dominica volcanics.

variation, but an average value of 28.6 has been taken in order to calculate C.I.P.W. norms. Slight variations of oxidation ratio in natural magmas will effect the % normative quartz, but practically all the Dominican volcanics analysed would still remain over-saturated with silica.

A few H_2O^+ determinations were tried, but results were very low, generally less than 0.5%. Consistency could not be maintained with the method available so it was abandoned.

Trace Element Analysis.

The elements Ba, Nb, Zr, Y, Sr, Rb, Zn, Cu, Ni and Sn were determined using a W target and an evacuated X-ray path. The analytical data were converted to concentrations (ppm) by the computer program "TRATIO", developed by Gill (1972). The program uses the count-rate function (peak intensity/background intensity-1). This function enables scattered background radiation to be used as an internal standard to compensate for matrix and mass absorption effects. The program enables corrections for blank/contamination and K_β interference to be included. It also calculates the nominal detection limit of each element from the formula $3(\overline{B}\frac{1}{2})$ where $\overline{B}$ is the mean background-under-peak in counts averaged over all the determinations processed. Calibration lines were separated into two segments to cover low and high ranges of element abundances. Nominal detection limits for the trace elements are given together with the upper limits of calibration overleaf:

	Detection Limit ppm	Upper Limit of standards ppm
Ba	8	5000
Nb	3	250
Zr	3	5000
Y	3	500
Sr	3	1100
Rb	3	1000
Zn	2	1000
Cu	2	1000
Ni	2	1000
Sn	3	500

Standards used were synthetic spiked glasses prepared by the Pilkington Research Laboratory (Lathom, England) for use in lunar investigations (Brown et al., 1970). These standards are in two sets in order to avoid inter-element interferences as much as possible.

VOLCANICS X.R.F. MAJOR AND TRACE ELEMENT ANALYSES WITH C.I.P.W. NORMS

Appendic es 1:3:1 to 1:3:4 list the major and trace element analyses, and C.I.P.W. norms. The best way to find a particular analysis is, first to check if one is available in the specimen collection appendix 1:1. This will also indicate where the analysis is to be found. There are four lists depending on the type of material analysed, these are:

		Symbol in appendix 1:1
Appendix 1:3:1 = Whole rock fresh volcanics	=	+ p.33
Appendix 1:3:2 = Sorted pyroclastic analyses	=	P p.57
Appendix 1:3:3 = Sulphur-rich specimens	=	S p.62
Appendix 1:3:4 = Altered and non-volcanic specimens	=	A p.63

NOTE trace element values below 3ppm are below the detection limit.

S.DOMINICA MAJORS,TRACES&NORMS(RECALC TO 100 H2O FREE,ALL FE AS FE2O3)

	SD1	SD3	SD4	SD6	SD7	SD9	SD10	SD11	SD14	SD15
PERCENT										
SIO2	64.47	64.31	66.51	64.74	64.64	64.57	64.71	64.20	64.65	65.42
AL2O3	16.54	16.57	15.96	16.34	16.08	16.63	16.65	16.63	16.50	16.39
FE2O3	5.65	5.64	4.64	5.53	5.53	5.31	5.27	5.56	5.45	5.09
MGO	1.35	1.31	1.16	1.20	1.73	1.33	1.31	1.42	1.33	1.20
CAO	5.89	6.11	5.57	6.06	5.76	5.88	6.01	6.10	6.20	6.00
NA2O	3.73	3.70	3.73	3.69	3.66	3.81	3.59	3.68	3.56	3.57
K2O	1.66	1.63	1.82	1.63	1.69	1.77	1.76	1.67	1.57	1.68
TIO2	0.45	0.45	0.37	0.45	0.45	0.44	0.44	0.46	0.45	0.37
MNO	0.15	0.15	0.13	0.14	0.13	0.14	0.14	0.14	0.15	0.14
P2O5	0.12	0.13	0.12	0.12	0.13	0.14	0.13	0.15	0.13	0.14
PPM										
BA	281	255	279	268	266	278	278	279	253	263
NB	9	9	7	7	9	9	8	9	9	8
ZR	115	111	116	112	114	116	119	123	114	122
Y	21	22	20	18	20	20	21	22	19	21
SR	264	277	276	262	258	266	276	262	270	265
RB	57	60	62	58	53	57	58	56	60	57
ZN	57	60	44	59	54	52	34	53	56	53
CL	28	37	22	76	1	12	40	33	34	32
NI	56	2	2	3	4	1	1	2	4	3
CIPW NORM										
QLTZ	20.90	20.80	23.80	21.60	20.30	20.40	21.60	20.60	22.00	23.00
CRTH	9.80	9.70	10.80	9.70	10.00	10.50	10.40	9.90	9.30	10.00
ALBT	31.70	31.40	31.70	31.40	32.80	32.40	30.50	31.30	30.20	30.30
ANOR	23.60	23.90	21.50	23.30	21.60	23.10	24.20	24.00	24.50	23.80
DICP	4.20	4.80	4.60	5.10	5.10	4.40	4.10	4.50	4.60	4.30
HYPR	6.50	6.00	4.90	5.70	6.80	6.00	6.00	6.40	6.00	5.60
MAGN	2.20	2.20	1.80	2.10	2.10	2.00	2.00	2.10	2.10	2.00
ILMN	0.90	0.90	0.70	0.90	0.90	0.80	0.80	0.90	0.90	0.70
APAT	0.30	0.30	0.30	0.30	0.30	0.30	0.30	0.40	0.30	0.30

S.DOMINICA MAJORS,TRACES&NORMS(RECALC TO 100 H2O FREE,ALL FE AS FE2O3)

	SD18	SD19	SD20	SD21	SD22	SD23	SD24	SD25	SD26	SD27
PERCENT										
SIO2	62.99	65.63	65.19	65.58	64.59	63.39	64.68	63.63	64.24	55.82
AL2O3	16.96	15.81	16.22	16.22	16.32	16.43	15.78	16.61	16.43	18.78
FE2O3	6.01	5.90	5.98	4.98	5.78	5.94	5.76	5.69	5.76	7.14
MGO	1.54	1.40	1.31	1.18	1.34	1.81	1.84	1.68	1.64	2.93
CAO	6.60	5.99	5.69	5.89	6.08	6.64	6.17	6.41	6.04	8.21
NA2O	3.57	2.83	3.13	3.74	3.49	3.43	3.21	3.61	3.52	4.03
K2O	1.54	1.69	1.71	1.75	1.69	1.58	1.82	1.61	1.63	1.94
TIO2	0.51	0.48	0.49	0.40	0.46	0.53	0.47	0.47	0.47	0.76
MNO	0.15	0.15	0.15	0.13	0.13	0.14	0.15	0.15	0.14	0.15
P2O5	0.14	0.11	0.12	0.13	0.13	0.13	0.12	0.13	0.13	0.24
PPM										
BA	246	252	261	265	267	262	244	255	278	291
NB	7	9	8	7	7	6	7	5	6	10
ZR	104	112	111	111	108	103	111	109	107	137
Y	19	19	20	17	19	17	17	17	15	22
SR	272	264	253	263	271	261	258	268	264	546
RB	55	58	58	58	61	56	66	57	63	43
ZN	63	56	68	52	63	60	60	65	64	71
CL	27	49	20	24	28	20	4	55	22	34
NI	5	3	2	2	5	4	3	4	5	5
CIPW NORM										
QLTZ	19.20	26.50	24.80	22.40	22.00	20.10	22.50	19.70	21.30	3.40
CRTH	9.10	10.00	10.20	10.40	10.00	9.40	10.80	9.60	9.70	11.50
ALBT	30.30	24.10	26.60	31.80	29.70	29.10	27.30	30.70	29.90	34.30
ANCR	25.80	25.60	25.30	22.40	24.00	24.90	23.40	24.50	24.30	27.60
DICP	5.10	3.00	1.90	5.10	4.60	6.10	5.90	5.50	4.10	9.70
HYPR	6.70	7.40	7.80	4.90	6.30	6.80	7.10	6.60	7.30	8.70
MAGN	2.30	2.30	2.30	1.90	2.20	2.30	2.20	2.20	2.20	2.80
ILMN	1.00	0.90	0.90	0.80	0.90	1.00	0.90	0.90	0.90	1.50
APAT	0.30	0.30	0.30	0.30	0.30	0.30	0.30	0.30	0.30	0.60

S.DOMINICA MAJORS,TRACES&NORMS(RECALC TO 100 H2O FREE,ALL FE AS FE2O3)

	SD28	SD30	SD32	SD34	SD35	SD36	SD37	SD38	SD39	SD40
PERCENT										
SIO2	64.59	65.21	60.85	52.59	55.71	64.32	53.88	56.65	51.97	56.10
AL2O3	16.51	16.72	16.91	19.63	17.79	16.11	19.48	17.88	19.48	18.13
FE2O3	5.57	4.97	7.23	8.96	9.12	6.21	9.15	8.88	9.68	8.61
MGO	1.24	1.04	2.34	3.01	2.96	1.57	3.06	2.60	3.82	2.76
CAO	6.21	5.82	7.25	11.21	8.69	6.11	9.90	8.35	10.71	8.61
NA2O	3.54	3.79	3.09	2.91	3.69	3.28	2.99	3.64	2.74	3.79
K2O	1.61	1.76	1.40	0.46	0.75	1.64	0.48	0.75	0.45	0.76
TIO2	0.46	0.41	0.63	0.89	0.92	0.50	0.77	0.90	0.82	0.88
MNO	0.14	0.13	0.17	0.18	0.20	0.15	0.19	0.18	0.19	0.19
P2O5	0.13	0.13	0.12	0.15	0.17	0.12	0.16	0.17	0.14	0.17
PPM										
BA	254	270	236	115	127	250	102	156	90	137
NB	7	9	11	5	9	11	5	6	9	9
ZR	107	112	94	46	61	114	64	80	51	85
Y	17	19	20	21	25	20	22	24	19	23
SR	272	262	263	349	268	259	299	271	294	273
RB	55	57	54	19	22	63	13	25	11	24
ZN	59	53	65	69	78	72	73	80	76	78
CU	25	23	84	114	139	5	38	128	33	39
NI	3	1	3	5	1	8	6	1	9	5
CIPW NORM										
QUTZ	22.00	21.80	17.50	5.60	7.90	22.50	7.70	10.10	4.90	8.20
CRTH	9.60	10.40	8.30	2.70	4.50	9.70	2.90	4.50	2.70	4.50
ALBT	30.10	32.20	26.30	24.80	31.40	27.90	25.50	31.00	23.40	32.30
ANCR	24.50	23.50	28.30	39.40	30.00	24.50	38.50	30.40	39.80	30.40
DICP	4.70	3.90	5.90	12.90	10.20	4.30	8.10	8.40	10.50	9.50
HYPR	5.80	5.20	9.40	9.00	10.30	7.40	11.90	10.10	13.10	9.70
MAGN	2.10	1.90	2.80	3.50	3.50	2.40	3.50	3.40	3.70	3.30
ILMN	0.90	0.80	1.20	1.70	1.80	1.00	1.50	1.70	1.60	1.70
APAT	0.30	0.30	0.30	0.40	0.40	0.30	0.40	0.40	0.30	0.40

S.DOMINICA MAJORS,TRACES&NORMS(RECALC TO 100 H2O FREE,ALL FE AS FE2O3)

	SD41	SD42	SD43	SD45	SD46	SD47	SD49	SD50	SD51	SD52
PERCENT										
SIO2	52.86	62.53	62.06	64.84	52.21	63.43	64.46	62.23	62.26	62.98
AL2O3	19.12	16.48	16.68	16.76	18.35	17.00	16.73	16.26	16.49	16.72
FE2O3	9.54	6.64	6.63	5.01	10.00	5.71	5.44	6.93	6.57	5.99
MGO	3.99	2.12	2.01	1.18	3.99	1.67	1.40	3.12	2.24	1.80
CAO	10.25	6.72	7.10	5.93	10.91	6.66	6.27	6.61	7.06	6.86
NA2O	2.67	3.27	3.16	3.82	2.68	3.33	3.41	2.62	3.20	3.38
K2O	0.43	1.40	1.48	1.82	0.63	1.45	1.58	1.45	1.32	1.47
TIO2	0.78	0.52	0.59	0.38	0.89	0.47	0.43	0.57	0.56	0.52
MNO	0.20	0.19	0.17	0.13	0.19	0.14	0.14	0.08	0.16	0.15
P2O5	0.16	0.13	0.13	0.13	0.14	0.14	0.13	0.13	0.14	0.13
PPM										
BA	99	237	260	248	135	260	263	208	271	251
NB	7	6	8	6	9	7	8	8	10	8
ZR	67	107	109	113	69	107	109	107	106	109
Y	20	22	24	21	22	20	18	21	18	21
SR	294	271	291	268	427	283	278	274	277	285
RB	15	48	57	57	21	59	57	54	60	57
ZN	85	60	69	48	83	57	60	68	68	62
CU	71	47	34	28	72	47	26	46	32	51
NI	25	3	3	3	10	5	5	2	4	1
CIPW NORM										
QLTZ	6.70	19.60	19.20	20.70	5.00	20.90	22.20	21.10	19.50	19.80
ORTH	2.60	8.30	8.80	10.80	3.80	8.60	9.40	8.60	7.80	8.70
ALBT	22.80	27.80	26.90	32.40	22.80	28.30	29.00	22.30	27.20	28.70
ANOR	39.20	26.30	27.10	23.30	36.40	27.30	25.80	28.50	26.90	26.20
DICP	9.00	5.30	6.20	4.50	14.10	4.20	3.90	3.00	6.10	5.90
HYPR	14.20	8.80	7.90	5.30	11.90	7.30	6.60	12.50	8.50	7.00
MAGN	3.70	2.60	2.60	1.90	3.90	2.20	2.10	2.70	2.50	2.30
ILMN	1.50	1.00	1.10	0.70	1.70	0.90	0.80	1.10	1.10	1.00
APAT	0.40	0.30	0.30	0.30	0.30	0.30	0.30	0.30	0.30	0.30

S.DOMINICA MAJORS,TRACES&NORMS(RECALC TO 100 H2O FREE,ALL FE AS FE2O3)

	SD53	SD54	SD55	SD56	SD58	SD59	SD60	SD61	SD63	SD64
PERCENT										
SIO2	59.47	53.28	52.50	54.45	53.89	52.91	60.76	62.27	60.33	51.46
AL2O3	17.27	18.98	18.76	19.36	18.93	19.52	17.49	16.82	17.26	19.11
FE2O3	7.15	9.42	9.69	8.85	8.71	9.04	6.80	6.32	6.98	10.40
MGO	2.75	3.20	4.63	3.16	3.97	3.77	2.04	1.90	2.30	4.37
CAO	8.64	10.75	10.10	9.24	10.72	10.50	7.58	7.22	7.86	10.24
NA2O	2.55	2.76	2.72	3.28	2.38	2.73	3.21	3.25	3.02	2.77
K2O	0.69	0.41	0.43	0.51	0.31	0.42	1.25	1.41	1.37	0.41
TIO2	0.72	0.87	0.81	0.73	0.75	0.77	0.60	0.55	0.61	0.82
MNO	0.16	0.19	0.20	0.19	0.18	0.18	0.16	0.15	0.15	0.13
P2O5	0.21	0.16	0.16	0.21	0.15	0.15	0.10	0.11	0.11	0.11
PPM										
BA	164	86	95	103	92	116	218	243	217	82
NB	8	7	7	8	7	7	9	10	11	7
ZR	99	48	48	56	69	59	95	100	94	45
Y	23	29	32	18	19	16	17	17	19	16
SR	365	407	355	352	306	309	279	260	285	392
RB	33	10	14	11	15	14	58	61	56	9
ZN	86	75	79	79	89	80	61	58	62	73
CL	8	95	138	162	77	57	63	59	161	196
NI	7	7	16	8	13	7	3	4	4	13
CIPW NORM										
CLTZ	17.00	7.60	5.50	7.60	9.50	6.50	17.20	19.20	16.70	2.50
CRTH	4.10	2.40	2.60	3.00	1.80	2.50	7.40	8.40	8.10	2.40
ALBT	25.10	23.50	23.20	27.90	20.30	23.30	27.30	27.60	25.70	23.60
ANOR	32.00	38.40	38.00	36.80	40.30	40.00	29.80	27.30	29.60	38.80
DICP	8.00	11.80	9.40	6.60	10.00	9.40	6.10	6.70	7.30	9.70
HPER	9.20	10.50	15.80	12.70	12.80	12.90	8.20	7.10	8.40	18.60
MAGN	2.80	3.60	3.70	3.40	3.40	3.50	2.60	2.40	2.70	2.00
ILMN	1.40	1.70	1.50	1.40	1.40	1.50	1.10	1.00	1.20	1.60
APAT	0.50	0.40	0.40	0.50	0.40	0.40	0.20	0.30	0.30	0.30

S.DOMINICA MAJORS,TRACES&NORMS(RECALC TO 100 H2O FREE,ALL FE AS FE2O3)

	SD66	SD67	SD69	SD70	SD71	SD72	SD74	SD75	SD76	SD79
PERCENT										
SIO2	51.29	64.85	64.35	64.51	64.18	64.78	64.39	65.22	65.40	62.46
AL2O3	19.30	16.53	16.35	16.52	16.79	16.41	16.67	17.55	16.73	17.39
FE2O3	9.78	5.40	6.35	5.70	5.57	5.55	5.68	5.36	5.57	6.28
MGO	4.44	1.36	1.25	1.40	1.39	1.28	1.29	0.98	1.16	1.75
CAO	11.13	6.07	6.09	6.06	6.16	5.88	6.10	5.23	5.45	6.86
NA2O	2.50	3.24	3.30	3.48	3.51	3.73	3.52	3.33	3.30	3.16
K2O	0.36	1.86	1.52	1.60	1.67	1.67	1.60	1.66	1.68	1.29
TIO2	0.86	0.50	0.50	0.46	0.45	0.43	0.47	0.43	0.46	0.53
MNO	0.19	0.13	0.16	0.15	0.14	0.14	0.15	0.14	0.15	0.15
P2O5	0.13	0.07	0.13	0.12	0.13	0.13	0.13	0.10	0.10	0.14
PPM										
BA	77	282	253	270	263	266	268	279	282	240
NB	6	9	7	9	9	6	8	9	7	7
ZR	60	133	108	119	113	114	112	115	115	102
Y	16	22	33	21	19	20	23	17	22	23
SR	327	243	257	268	273	267	274	235	293	261
RB	16	78	51	54	59	55	54	61	63	48
ZN	84	60	69	57	58	58	60	58	62	61
CU	23	13	47	32	29	54	26	22	24	33
NI	23	2	2	3	2	4	1	2	3	4
CIPW NORM										
QLTZ	4.40	22.90	23.10	22.10	21.20	21.40	21.90	25.00	24.50	20.50
ORTH	2.10	11.00	9.00	9.50	9.90	9.90	9.50	9.80	10.00	7.70
ALBT	21.30	27.50	28.10	29.60	29.80	31.70	29.90	28.30	28.00	26.90
ANOR	40.70	25.20	25.40	24.80	25.20	23.20	25.10	25.40	26.00	29.60
DICP	11.60	3.90	3.40	3.80	3.90	4.40	3.80	0.00	0.40	3.10
HYPR	14.20	6.30	7.20	6.80	6.60	6.10	6.50	7.40	7.80	8.50
MAGN	3.80	2.10	2.40	2.20	2.10	2.10	2.20	2.10	2.10	2.40
ILMN	1.60	1.00	1.00	0.90	0.90	0.80	0.90	0.80	0.90	1.00
APAT	0.30	0.20	0.30	0.30	0.30	0.30	0.30	0.20	0.20	0.30

S.DOMINICA MAJORS,TRACES&NORMS(RECALC TO 100 H2O FREE,ALL FE AS FE2O3)

	SD80	SD85	SD88	SD89	SD90	SD95	SD98	SD99H	SD99X	SD100
PERCENT										
SIO2	64.58	63.56	63.45	62.88	64.13	63.71	63.77	63.65	57.69	64.49
AL2O3	17.01	16.72	16.71	16.63	17.34	16.98	17.15	17.05	18.37	16.47
FE2O3	5.79	5.93	6.28	6.56	5.62	6.00	5.96	5.84	8.40	5.71
MGO	1.40	1.55	1.58	1.65	1.27	1.47	1.49	1.43	2.66	1.34
CAO	6.08	6.69	6.47	6.93	5.90	6.06	6.11	6.04	7.97	6.05
NA2O	3.16	3.35	3.33	3.18	3.29	3.45	3.37	3.68	2.89	3.62
K2O	1.23	1.42	1.40	1.36	1.74	1.59	1.37	1.57	1.03	1.59
TIO2	0.47	0.49	0.50	0.52	0.43	0.46	0.49	0.47	0.68	0.47
MNO	0.15	0.15	0.15	0.16	0.14	0.15	0.15	0.15	0.19	0.14
P2O5	0.14	0.12	0.13	0.12	0.12	0.12	0.13	0.11	0.12	0.12
PPM										
BA	279	256	246	227	265	267	288	254	179	265
NB	7	9	10	7	7	8	8	5	7	8
ZR	115	104	107	96	113	110	114	110	74	112
Y	20	18	21	17	19	17	22	17	19	18
SR	279	272	274	272	258	260	272	258	279	261
RB	25	49	52	50	60	55	49	55	42	60
ZN	58	62	68	68	59	60	61	64	87	71
CU	37	27	60	42	45	27	31	52	192	32
NI	2	4	1	6	3	2	4	3	4	3
CIPW NORM										
QUTZ	24.60	21.30	21.40	21.00	22.10	21.00	22.00	20.00	13.90	21.60
ORTH	7.30	8.40	8.30	8.10	10.30	9.40	8.10	9.30	6.10	9.40
ALBT	26.80	28.50	28.30	27.00	28.00	29.30	28.60	31.30	24.60	30.80
ANOR	28.70	26.50	26.60	27.20	27.50	26.30	27.70	25.50	34.30	24.10
DICP	0.50	5.10	4.00	5.50	0.90	2.60	1.50	3.30	3.90	4.40
HYPR	8.50	6.70	7.70	7.40	7.90	7.90	8.40	7.30	12.40	6.30
MAGN	2.20	2.30	2.40	2.50	2.20	2.30	2.30	2.30	3.20	2.20
ILMN	0.90	0.90	1.00	1.00	0.80	0.90	0.90	0.90	1.30	0.90
APAT	0.30	0.30	0.30	0.30	0.30	0.30	0.30	0.30	0.30	0.30

S.DOMINICA MAJORS,TRACES&NORMS(RECALC TO 100 H2O FREE,ALL FE AS FE2O3)

	SD102	SD103	SD106	SD107	SD109	SD110	SD114	SD115	SD116	SD117
PERCENT										
SIO2	57.95	63.53	63.55	64.48	62.42	63.54	63.73	64.27	65.27	63.88
AL2O3	18.06	16.66	16.94	16.25	17.00	17.21	16.94	16.31	16.35	16.62
FE2O3	7.33	6.08	5.99	5.89	6.51	6.10	5.85	5.81	5.40	5.83
MGO	3.03	1.80	1.59	1.89	1.71	1.52	1.38	1.46	1.23	1.48
CAO	8.78	6.98	6.57	6.25	6.93	6.21	6.60	6.48	6.33	6.21
NA2O	3.00	2.93	3.07	3.21	3.17	3.15	3.19	3.41	3.10	3.59
K2O	0.77	1.30	1.43	1.37	1.42	1.51	1.54	1.52	1.60	1.62
TIO2	0.72	0.46	0.48	0.43	0.56	0.48	0.49	0.47	0.46	0.49
MNO	0.18	0.15	0.15	0.10	0.15	0.15	0.15	0.15	0.14	0.15
P2O5	0.18	0.13	0.15	0.13	0.12	0.13	0.12	0.13	0.12	0.12
PPM										
BA	175	236	279	257	244	246	260	255	253	266
NB	9	7	6	7	6	7	7	10	9	11
ZR	97	104	111	108	106	112	108	110	112	111
Y	22	18	18	14	20	20	21	20	20	20
SR	352	291	275	263	267	271	275	286	282	261
RB	27	45	60	62	49	45	53	53	54	59
ZN	82	61	63	62	65	64	62	63	59	57
CU	19	30	26	39	27	24	16	32	14	15
NI	10	4	2	4	2	3	2	3	1	2
CIPW NORM										
QUTZ	13.80	22.90	22.60	23.30	20.10	22.10	22.10	22.00	24.90	20.90
CRTH	4.60	7.70	8.50	8.10	8.40	9.00	9.10	9.00	9.50	9.60
ALBT	25.50	24.90	26.10	27.30	27.00	26.80	27.10	29.00	26.30	30.90
ANOR	33.70	28.60	28.40	26.00	29.10	28.50	27.50	24.80	26.10	24.60
DICP	7.30	4.40	2.90	3.60	4.70	1.30	3.90	5.50	3.90	4.70
HYPER	10.50	7.90	8.00	8.30	7.80	8.70	6.80	6.20	6.00	6.70
MAGN	2.80	2.30	2.30	2.30	2.50	2.40	2.30	2.20	2.10	2.20
ILMN	1.40	0.90	0.90	0.80	1.10	0.90	0.90	0.90	0.90	0.90
APAT	0.40	0.30	0.40	0.30	0.30	0.30	0.30	0.30	0.30	0.30

S.DOMINICA MAJORS,TRACES&NORMS(RECALC TO 100 H2O FREE,ALL FE AS FE2O3)

	SD118	SD119	SD122	SD125	SD126	SD128	SD129	SD130	SD131	SD132
PERCENT										
SIO2	63.72	64.44	61.92	63.40	63.46	63.34	64.14	63.01	63.91	64.16
AL2O3	17.16	16.52	17.44	16.82	16.57	16.99	17.12	17.49	16.90	16.46
FE2O3	5.93	6.02	7.00	6.11	6.24	6.27	5.73	6.17	5.69	5.67
MGO	1.41	1.44	1.81	1.63	1.56	1.65	1.40	1.57	1.45	1.57
CAO	6.52	6.71	7.20	6.97	6.49	6.65	6.14	6.42	6.29	6.08
NA2O	2.84	2.60	2.55	2.93	3.41	3.00	3.21	3.06	3.24	3.71
K2O	1.67	1.52	1.25	1.36	1.50	1.31	1.52	1.49	1.74	1.63
TIO2	0.49	0.49	0.53	0.51	0.51	0.51	0.46	0.50	0.51	0.47
MNO	0.14	0.15	0.17	0.15	0.15	0.15	0.15	0.15	0.14	0.13
P2O5	0.13	0.12	0.13	0.12	0.12	0.12	0.13	0.13	0.14	0.12
PPM										
BA	254	245	209	253	247	251	253	260	254	272
NB	7	9	7	6	10	12	5	8	11	8
ZR	107	115	98	100	117	112	107	110	117	110
Y	21	22	16	19	20	19	19	19	18	17
SR	270	282	292	271	273	264	262	259	282	269
RB	56	51	50	49	52	41	52	53	60	56
ZN	62	62	73	64	70	63	57	60	58	57
CU	34	27	32	62	30	38	26	23	34	50
NI	3	3	9	6	2	4	3	3	4	3
CIPW NORM										
QLTZ	23.30	25.70	22.30	22.80	20.80	22.70	22.90	21.60	21.80	20.30
ORTH	9.90	9.00	7.40	8.10	8.90	7.80	9.00	8.80	10.30	9.70
ALBT	24.10	22.10	21.70	24.90	29.00	25.50	27.30	26.00	27.50	31.90
ANOR	29.30	29.00	32.60	28.90	25.60	29.20	27.90	29.70	26.50	23.50
DICP	2.00	3.00	2.00	4.30	5.00	2.70	1.50	1.20	3.20	5.00
HYPR	7.90	7.60	10.00	7.50	7.10	8.50	8.00	9.00	7.10	6.60
MAGN	2.30	2.30	2.70	2.40	2.40	2.40	2.20	2.40	2.20	2.20
ILMN	0.90	0.90	1.00	1.00	1.00	1.00	0.90	1.00	1.00	0.90
APAT	0.30	0.30	0.30	0.30	0.30	0.30	0.30	0.30	0.30	0.30

S.DOMINICA MAJORS,TRACES&NORMS(RECALC TO 100 H2O FREE,ALL FE AS FE2O3)

	SD133	SD135	SD136A	SD136P	SD137	SD138	SD139	SD140	SD141	SD142
PERCENT										
SIO2	64.02	53.55	64.31	52.43	50.41	50.85	58.15	57.72	52.66	53.04
AL2O3	16.60	19.25	16.54	19.66	20.39	20.12	18.21	18.58	19.91	20.26
FE2O3	6.08	8.68	5.89	9.42	10.11	9.87	8.48	8.79	9.43	8.98
MGO	1.49	3.52	1.47	3.71	4.37	4.08	2.36	2.06	2.90	2.79
CAO	6.36	10.57	6.33	10.32	10.58	10.71	8.37	8.47	10.33	10.57
NA2O	3.11	2.62	3.13	2.82	2.62	2.75	2.94	2.90	3.02	2.91
K2O	1.57	0.71	1.58	0.49	0.33	0.43	0.50	0.43	0.59	0.41
TIO2	0.50	0.82	0.48	0.80	0.86	0.85	0.63	0.66	0.78	0.73
MNO	0.15	0.17	0.15	0.19	0.19	0.19	0.23	0.23	0.19	0.20
P2O5	0.13	0.10	0.12	0.16	0.13	0.15	0.15	0.15	0.18	0.15
PPM										
BA	257	104	271	91	88	88	96	93	120	98
NB	7	6	7	5	8	6	8	7	8	8
ZR	114	56	115	52	49	48	59	63	64	62
Y	20	18	18	18	19	16	22	22	22	20
SR	271	325	265	282	266	261	304	302	344	339
RB	54	18	59	17	2	13	12	8	19	17
ZN	63	64	60	69	67	68	82	88	73	73
CL	13	52	34	20	89	109	58	15	93	79
NI	3	14	4	8	6	9	3	1	8	4
CIPW NORM										
QLTZ	22.90	7.40	23.20	5.50	2.90	3.00	15.80	15.80	5.50	6.80
ORTH	9.30	4.20	9.40	2.90	2.00	2.60	3.00	2.60	3.50	2.40
ALBT	26.40	22.30	26.60	24.00	22.30	23.40	25.00	24.70	25.70	24.80
ANOR	26.80	38.90	26.50	39.80	43.20	41.60	35.20	36.60	39.30	41.30
DICP	3.40	10.90	3.50	8.80	7.20	9.00	4.60	3.90	9.30	8.80
HYPR	7.60	11.10	7.30	13.40	16.50	14.60	11.50	11.30	11.20	10.70
MAGN	2.30	3.40	2.30	3.60	3.90	3.80	3.30	3.40	3.60	3.50
ILMN	1.00	1.60	0.90	1.50	1.60	1.60	1.20	1.30	1.50	1.40
APAT	0.30	0.20	0.30	0.40	0.30	0.40	0.40	0.40	0.40	0.40

S.DOMINICA MAJORS,TRACES&NORMS(RECALC TO 100 H2O FREE,ALL FE AS FE2O3)

	SD143	SD144	SD145	SD146	SD147	SD148	SD149	SD150	SD151	SD152
PERCENT										
SIO2	51.73	56.49	51.00	54.03	56.02	55.41	54.59	56.20	55.79	54.64
AL2O3	18.88	19.37	19.64	18.86	18.15	19.22	18.87	18.56	17.89	19.35
FE2O3	9.70	8.01	9.70	9.14	8.90	8.62	8.65	8.68	9.21	8.81
MGO	5.01	1.88	4.31	3.68	2.75	2.48	2.91	2.65	2.92	2.79
CAO	10.54	9.41	11.11	10.25	8.69	9.82	9.78	8.85	8.70	9.61
NA2O	2.61	3.09	2.70	2.46	3.55	2.80	3.38	3.14	3.49	3.01
K2O	0.41	0.66	0.33	0.46	0.70	0.61	0.60	0.72	0.71	0.57
TIO2	0.76	0.74	0.85	0.75	0.88	0.69	0.87	0.86	0.91	0.88
MNO	0.20	0.16	0.19	0.20	0.21	0.19	0.18	0.19	0.19	0.18
P2O5	0.16	0.17	0.17	0.17	0.16	0.17	0.18	0.16	0.17	0.17
PPM										
BA	74	139	99	96	147	115	110	135	123	104
NB	8	9	6	6	8	8	8	7	9	6
ZR	53	72	58	69	81	80	69	77	80	68
Y	17	20	19	19	27	21	25	26	26	21
SR	269	296	324	316	271	292	303	277	273	300
RB	14	19	8	17	26	19	21	21	25	18
ZN	80	80	76	88	80	82	81	77	85	81
CU	80	69	90	39	82	62	92	114	174	241
NI	31	2	15	7	3	1	2	4	2	1
CIPW NORM										
QLTZ	4.10	12.20	3.30	9.60	9.20	11.10	7.20	11.20	9.00	9.20
ORTH	2.40	3.90	2.00	2.70	4.20	3.60	3.60	4.30	4.20	3.40
ALBT	22.20	26.30	23.00	21.00	30.20	23.80	28.80	26.70	29.70	25.60
ANOR	38.90	37.30	40.80	39.30	31.70	38.30	34.80	34.60	31.30	37.80
DICP	10.40	7.20	11.20	8.90	8.80	8.00	10.70	7.10	9.20	7.50
HYPR	16.30	8.20	14.00	13.10	10.40	10.10	9.60	10.80	10.80	11.00
MAGN	3.70	3.10	3.70	3.50	3.40	3.30	3.30	3.40	3.60	3.40
ILMN	1.50	1.40	1.60	1.40	1.70	1.30	1.70	1.60	1.70	1.70
APAT	0.40	0.40	0.40	0.40	0.40	0.40	0.40	0.40	0.40	0.40

S.DOMINICA MAJORS,TRACES&NORMS(RECALC TO 100 H2O FREE,ALL FE AS FE2O3)

	SD153	SD154	SD155	SD156	SD157	SD158	SD159	SD160	SD161	SD162
PERCENT										
SIO2	51.92	62.38	61.18	61.62	53.96	55.44	55.43	63.76	64.20	52.67
AL2O3	19.28	16.64	16.81	17.27	19.26	19.09	18.82	16.29	16.52	19.22
FE2O3	10.05	6.57	6.96	6.86	9.23	9.22	9.19	6.80	5.85	9.61
MGO	4.13	1.94	2.14	1.99	2.99	2.41	2.61	0.70	1.55	3.89
CAO	10.38	6.98	7.56	6.95	10.17	9.48	9.48	4.96	6.07	10.16
NA2O	2.55	3.03	3.02	2.94	3.06	2.81	2.95	3.56	3.47	2.79
K2O	0.38	1.63	1.43	1.51	0.27	0.49	0.42	2.58	1.59	0.49
TIO2	0.95	0.55	0.61	0.59	0.73	0.71	0.72	0.96	0.49	0.84
MNO	0.21	0.15	0.16	0.15	0.21	0.23	0.22	0.14	0.14	0.20
P2O5	0.15	0.13	0.12	0.11	0.13	0.13	0.14	0.25	0.11	0.14
PPM										
BA	88	241	229	247	79	88	98	395	259	102
NB	5	6	5	8	6	7	7	31	8	6
ZR	47	100	95	99	54	60	56	161	109	52
Y	21	24	22	26	19	19	18	24	20	19
SR	288	258	268	257	288	295	289	409	263	259
RB	11	61	55	62	11	15	14	81	55	17
ZN	79	58	62	64	73	81	81	67	60	74
CU	127	79	77	74	48	51	32	55	35	69
NI	5	3	4	2	3	3	1	38	3	5
CIPW NORM										
QLTZ	5.90	19.90	18.20	19.40	8.00	11.70	11.10	20.30	21.60	5.90
CRTH	2.30	9.70	8.50	9.00	1.60	2.90	2.50	15.30	9.40	2.90
ALBT	21.70	25.80	25.70	25.00	26.10	23.90	25.10	30.30	29.50	23.80
ANOR	40.30	27.10	28.20	29.60	38.30	38.30	37.10	21.00	24.90	38.70
DICP	8.70	5.70	7.20	3.60	9.70	6.90	7.80	1.80	3.90	9.10
HYPR	15.00	8.00	8.00	9.40	11.10	11.10	11.10	6.30	7.20	13.90
MAGN	3.90	2.50	2.70	2.60	3.60	3.60	3.60	2.60	2.30	3.70
ILMN	1.80	1.00	1.20	1.10	1.40	1.40	1.40	1.80	0.90	1.60
APAT	0.40	0.30	0.30	0.30	0.30	0.30	0.30	0.60	0.30	0.30

S.DOMINICA MAJORS,TRACES&NORMS(RECALC TO 100 H2O FREE,ALL FE AS FE2O3)

	SD163	SD164	SD165	SD166	SD167	SD168	SD169	SD171	SD173	SD174
PERCENT										
SIO2	52.10	63.91	64.09	57.36	52.64	52.55	52.43	52.66	53.85	56.12
AL2O3	20.07	16.78	16.72	18.07	19.90	20.30	19.67	19.91	19.83	18.41
FE2O3	9.39	6.25	6.03	8.09	9.07	9.19	9.59	9.42	8.79	8.75
MGO	2.92	1.34	1.47	2.75	3.14	3.15	3.43	3.46	2.68	2.56
CAO	10.98	6.03	5.98	8.74	10.62	10.38	10.39	9.99	9.91	8.57
NA2O	2.95	3.10	3.17	3.05	3.06	2.86	2.87	2.93	3.29	3.63
K2O	0.36	1.74	1.78	0.86	0.40	0.39	0.42	0.41	0.45	0.73
TIO2	0.89	0.56	0.52	0.76	0.82	0.83	0.85	0.87	0.87	0.87
MNO	0.19	0.17	0.15	0.18	0.19	0.19	0.20	0.19	0.19	0.19
P2O5	0.15	0.11	0.10	0.13	0.17	0.16	0.15	0.16	0.17	0.16
PPM										
BA	71	253	256	151	84	107	111	93	110	132
NB	5	5	7	8	5	8	7	8	4	6
ZR	50	110	109	70	48	49	67	50	68	77
Y	17	18	18	20	19	17	22	18	25	23
SR	425	241	244	285	312	310	296	283	312	279
RB	11	71	71	28	12	13	11	13	15	26
ZN	72	59	58	75	78	80	82	75	83	81
CU	165	89	52	91	111	111	97	129	111	169
NI	5	2	3	4	8	8	5	3	4	4
CIPW NORM										
QLTZ	5.20	22.70	22.40	12.70	5.40	6.20	5.70	6.00	7.00	9.20
CRTH	2.10	10.30	10.60	5.10	2.40	2.30	2.50	2.40	2.70	4.30
ALBT	25.10	26.40	26.90	26.00	26.10	24.40	24.50	25.00	28.00	30.90
ANOR	40.70	26.90	26.20	33.30	39.60	41.70	39.80	40.20	38.20	32.00
DICP	10.90	2.10	2.40	7.90	10.20	7.50	9.20	7.10	8.40	8.10
HPER	10.20	7.90	7.90	10.20	10.90	12.30	12.60	13.50	10.30	10.10
MAGN	3.60	2.40	2.30	3.10	3.50	3.60	3.70	3.60	3.40	3.40
ILMN	1.70	1.10	1.00	1.50	1.60	1.60	1.60	1.70	1.70	1.70
APAT	0.40	0.30	0.20	0.30	0.40	0.40	0.40	0.40	0.40	0.40

S.DOMINICA MAJORS,TRACES&NORMS(RECALC TO 100 H2O FREE,ALL FE AS FE2O3)

	SD175	SD176	SD177	SD178	SD179	SD180	SD181	SD182	SD183	SD184
PERCENT										
SIO2	51.25	56.92	53.76	50.29	52.00	49.95	48.18	49.33	63.03	52.27
AL2O3	20.14	18.21	18.98	19.73	19.49	19.60	17.69	18.26	16.89	20.07
FE2O3	10.33	8.48	9.54	9.28	9.64	10.23	10.15	11.21	6.47	11.78
MGO	3.49	2.44	3.55	7.41	4.51	4.87	9.48	7.39	1.77	1.39
CAO	10.07	8.45	9.70	9.98	10.47	11.33	11.16	10.26	7.21	2.06
NA2O	2.98	3.57	2.86	1.87	2.33	2.46	1.66	1.50	2.64	0.47
K2O	0.50	0.74	0.42	0.30	0.40	0.34	0.25	0.57	1.21	0.58
TIO2	0.88	0.85	0.81	0.80	0.81	0.89	0.91	1.14	0.48	1.09
MNO	0.20	0.17	0.21	0.18	0.19	0.19	0.18	0.21	0.16	0.25
P2O5	0.16	0.17	0.17	0.15	0.16	0.15	0.10	0.12	0.13	0.04
PPM										
BA	78	140	98	92	84	86	69	99	217	248
NB	7	8	6	8	4	5	7	3	7	2
ZR	57	83	72	64	57	51	46	65	99	97
Y	23	26	19	16	18	17	18	21	19	29
SR	275	270	301	306	303	299	322	287	294	199
RB	21	21	17	9	14	13	11	18	48	14
ZN	80	79	91	87	78	79	73	83	69	101
CU	102	93	68	92	80	91	106	112	2	116
NI	4	1	13	20	21	19	26	17	7	11
CIPW NORM										
QLTZ	3.40	10.80	8.10	3.40	6.30	2.10	0.00	$ 3.30	23.60	36.50
CRTH	3.00	4.40	2.50	1.80	2.40	2.00	1.50	3.40	7.20	3.50
ALBT	25.40	30.40	24.40	15.90	19.90	21.00	14.20	12.80	22.40	4.00
ANOR	40.40	31.70	38.00	44.90	41.80	41.70	40.50	41.80	30.80	10.00
DICP	7.40	7.80	7.70	3.20	7.70	11.40	11.90	7.10	3.60	0.00
HYPR	14.40	9.60	13.70	25.30	16.20	15.80	23.20	24.90	8.60	14.00
MAGN	4.00	3.30	3.70	3.60	3.70	4.00	3.90	4.30	2.50	4.60
ILMN	1.70	1.60	1.50	1.50	1.50	1.70	1.70	2.20	0.90	2.10
APAT	0.40	0.40	0.40	0.40	0.40	0.40	0.20	0.30	0.30	0.10

$ Contains 2.9% olivine.

S.DOMINICA MAJORS,TRACES&NORMS(RECALC TO 100 H2O FREE,ALL FE AS FE2O3)

	SD185	SD186	SD187	SD188	SD189	SD190	SD194	SD195	SD198	SD199
PERCENT										
SIO2	51.72	52.00	52.31	51.64	56.62	62.51	64.07	62.52	62.70	53.29
AL2O3	19.35	19.93	19.87	20.05	18.54	17.29	16.65	16.34	17.20	18.94
FE2O3	10.16	9.36	9.52	9.69	7.99	6.45	6.34	6.45	6.77	9.58
MGO	3.73	3.24	3.08	3.30	3.07	1.76	1.40	2.99	1.50	3.85
CAO	10.28	9.94	10.23	10.29	8.90	7.02	6.51	7.01	7.00	9.79
NA2O	3.00	3.42	2.85	2.93	2.92	2.67	2.77	2.56	2.65	2.96
K2O	0.45	0.72	0.73	0.70	0.98	1.49	1.50	1.37	1.32	0.47
TIO2	0.97	1.00	1.05	1.05	0.69	0.56	0.50	0.47	0.58	0.77
MNO	0.19	0.19	0.18	0.19	0.18	0.15	0.13	0.17	0.18	0.19
P2O5	0.14	0.19	0.17	0.16	0.10	0.11	0.12	0.12	0.13	0.17
PPM										
BA	104	133	134	134	164	269	259	229	273	115
NB	10	9	10	9	8	6	8	7	7	10
ZR	62	76	81	75	84	111	100	92	119	62
Y	21	24	27	23	23	23	23	19	27	33
SR	305	354	362	366	253	247	259	243	276	302
RB	16	16	19	12	40	63	58	53	35	16
ZN	87	76	74	75	84	66	63	64	71	100
CU	116	123	137	132	75	33	38	45	77	102
NI	8	6	5	6	7	5	3	4	3	11
CIPW NORM										
CLTZ	3.90	2.50	5.50	3.90	11.20	22.10	24.70	21.70	23.30	6.40
CRTH	2.70	4.30	4.30	4.20	5.80	8.80	8.90	8.10	7.80	2.80
ALBT	25.60	29.10	24.30	25.00	24.90	22.70	23.60	21.80	22.50	25.20
ANOR	38.30	37.20	39.50	39.80	34.80	30.90	28.70	29.20	31.30	37.30
DICP	10.10	9.30	8.70	8.80	7.40	2.80	2.50	4.10	2.30	8.70
HPER	13.30	11.60	11.60	12.30	11.20	8.80	8.00	11.50	8.70	14.10
MAGN	3.90	3.60	3.70	3.70	3.10	2.50	2.40	2.50	2.60	3.70
ILMN	1.90	1.90	2.00	2.00	1.30	1.10	1.00	0.90	1.10	1.50
APAT	0.30	0.50	0.40	0.40	0.20	0.30	0.30	0.30	0.30	0.40

S.DOMINICA MAJORS,TRACES&NORMS(RECALC TO 100 H2O FREE,ALL FE AS FE2O3)

	SD2OOH	SD2OOX	SD201	SD202	SD203	SD204	SD206	SD207	SD208	SD210
PERCENT										
SIO2	61.93	56.69	63.78	61.86	61.83	64.30	64.13	65.12	64.70	56.65
AL2O3	17.39	18.04	16.54	16.59	16.50	16.57	16.85	16.33	16.90	17.89
FE2O3	6.80	9.37	6.06	6.70	6.48	5.58	6.48	5.74	6.10	8.78
MGO	1.48	2.50	1.79	2.18	2.36	1.68	1.44	1.23	1.40	2.65
CAO	6.98	8.43	6.49	7.22	7.39	6.46	6.08	6.23	6.24	8.40
NA2O	3.25	2.69	2.83	3.05	3.11	2.95	2.63	3.17	2.94	3.66
K2O	1.29	1.01	1.73	1.58	1.51	1.73	1.59	1.46	1.45	0.74
TIO2	0.60	0.92	0.50	0.56	0.55	0.46	0.52	0.43	0.48	0.87
MNO	0.16	0.19	0.15	0.15	0.15	0.15	0.16	0.15	0.12	0.19
P2O5	0.12	0.17	0.13	0.11	0.11	0.12	0.12	0.13	0.11	0.16
PPM										
BA	258	180	274	231	237	276	246	245	233	147
NB	6	11	10	10	9	9	11	8	8	8
ZR	117	92	112	104	97	116	112	111	111	81
Y	30	23	17	15	18	17	25	21	21	28
SR	267	274	240	243	244	244	256	300	288	273
RB	20	37	67	59	58	70	60	49	45	24
ZN	70	88	62	66	61	60	69	63	69	79
CU	93	128	15	24	35	19	49	16	38	113
NI	1	2	3	5	6	2	2	4	4	2
CIPW NORM										
QLTZ	19.60	13.60	23.00	18.80	18.40	23.20	25.30	24.80	26.80	9.90
CRTH	7.70	6.00	10.30	9.40	9.00	10.30	9.40	8.70	8.60	4.40
ALBT	27.60	22.90	24.10	25.90	26.40	25.10	22.40	26.90	21.60	31.20
ANCR	29.20	34.40	27.40	27.00	26.70	27.00	29.50	26.10	30.40	30.40
DICP	4.10	5.50	3.40	6.80	7.80	3.70	0.00	3.40	0.00	8.70
HPER	7.80	11.70	8.30	8.10	7.90	7.50	9.50	6.70	9.00	10.00
MAGN	2.60	3.60	2.30	2.60	2.50	2.10	2.50	2.20	2.40	3.40
ILMN	1.10	1.80	1.00	1.10	1.00	0.90	1.00	0.80	0.90	1.70
APAT	0.30	0.40	0.30	0.30	0.30	0.30	0.30	0.30	0.30	0.40

S.DOMINICA MAJORS,TRACES&NORMS(RECALC TO 100 H2O FREE,ALL FE AS FE2O3)

	SD215	SD220	SD222	SD223	SD226	SD227	SD228H	SD228X	SD230	SD231
PERCENT										
SIO2	49.95	66.20	63.15	62.97	64.21	62.08	61.56	52.48	61.69	65.13
AL2O3	19.88	16.27	17.04	16.71	16.47	16.85	17.85	20.01	18.11	16.46
FE2O3	10.45	5.35	6.33	6.40	5.73	6.66	6.81	9.36	6.92	5.85
MGO	4.54	1.00	1.70	1.72	1.65	2.01	2.24	4.29	1.86	1.26
CAO	11.21	5.90	6.11	6.56	6.26	6.82	6.64	9.75	6.64	6.05
NA2O	2.27	2.99	3.44	3.42	3.38	3.31	2.79	2.15	2.79	2.89
K2O	0.43	1.62	1.44	1.44	1.56	1.41	1.23	0.74	1.12	1.61
TIO2	0.96	0.42	0.51	0.52	0.48	0.59	0.62	0.92	0.59	0.48
MNO	0.19	0.14	0.16	0.12	0.14	0.15	0.16	0.18	0.17	0.15
P2O5	0.13	0.12	0.12	0.13	0.13	0.12	0.10	0.12	0.11	0.12
PPM										
BA	113	279	253	233	256	224	239	104	222	259
NB	8	8	6	7	8	7	7	8	10	10
ZR	91	117	103	109	103	98	100	60	108	126
Y	21	18	21	21	18	17	20	24	23	20
SR	334	263	263	286	267	269	287	290	283	269
RB	12	58	59	47	45	51	26	15	19	55
ZN	76	54	69	58	63	63	64	72	71	61
CL	127	28	32	25	36	53	69	78	45	23
NI	11	1	2	3	6	4	5	10	2	3
CIPW NORM										
QLTZ	3.10	27.20	20.40	20.00	21.90	18.90	20.70	7.60	21.80	25.80
CRTH	2.60	9.60	8.50	8.60	9.30	8.40	7.30	4.40	6.70	9.60
ALBT	19.40	25.40	29.20	29.10	28.70	28.10	23.70	18.30	23.70	24.60
ANCR	43.10	26.30	26.90	26.10	25.30	27.10	32.40	43.10	32.40	27.30
DICP	9.90	2.00	2.30	4.80	4.20	5.10	0.00	4.00	0.00	1.70
HPER	15.80	6.40	8.90	7.70	7.20	8.50	11.70	17.00	10.90	7.60
MAGN	4.00	2.10	2.40	2.50	2.20	2.60	2.60	3.60	2.70	2.30
ILMN	1.80	0.80	1.00	1.00	0.90	1.10	1.20	1.80	1.10	0.90
APAT	0.30	0.30	0.30	0.30	0.30	0.30	0.20	0.30	0.30	0.30

S.DOMINICA MAJORS,TRACES&NORMS(RECALC TO 100 H2O FREE,ALL FE AS FE2O3)

	SD233	SD236	SD242	SD243	SD244	SD246	SD247	SD248	SD252	SD257
PERCENT										
SIO2	64.32	61.62	62.46	63.67	63.31	65.71	63.88	65.65	53.37	54.24
AL2O3	17.30	17.16	16.83	16.69	16.99	16.62	16.98	16.03	19.56	17.81
FE2O3	6.04	6.39	6.45	5.86	5.68	5.02	5.51	5.64	8.83	9.53
MGO	1.40	2.35	2.05	1.74	1.71	1.24	1.34	1.27	3.30	4.40
CAO	6.28	7.14	7.15	6.43	6.80	5.73	6.18	5.80	10.54	9.45
NA2O	2.35	3.20	2.71	3.43	3.38	3.27	3.75	3.16	2.34	2.46
K2O	1.53	1.33	1.49	1.40	1.35	1.75	1.65	1.71	0.93	0.87
TIO2	0.50	0.52	0.58	0.48	0.45	0.39	0.45	0.47	0.80	0.88
MNO	0.15	0.16	0.15	0.15	0.15	0.13	0.14	0.14	0.18	0.20
P2O5	0.12	0.13	0.13	0.14	0.13	0.13	0.12	0.12	0.15	0.16
PPM										
BA	258	230	252	264	264	271	266	269	167	172
NB	8	9	9	4	11	6	6	10	4	5
ZR	113	108	112	109	213	115	112	114	70	67
Y	20	21	20	21	17	17	18	22	18	16
SR	263	261	288	275	282	273	273	267	310	299
RB	53	52	58	52	54	60	56	57	35	20
ZN	58	67	65	61	62	50	56	58	57	64
CU	46	23	60	56	53	16	19	31	114	108
NI	3	20	5	6	5	2	2	2	4	6
CIPW NORM										
QUTZ	27.20	18.20	21.60	21.10	20.50	24.70	19.80	25.30	8.00	8.80
ORTH	9.10	7.90	8.80	8.30	8.20	10.40	9.80	10.10	5.50	5.20
ALBT	20.00	27.20	23.00	29.20	28.70	27.80	31.90	26.90	19.90	21.00
ANOR	30.50	28.70	29.50	26.10	27.20	25.60	24.70	24.60	40.40	35.20
DICP	0.00	5.00	4.40	4.20	4.90	1.70	4.40	2.90	5.30	9.00
HYPR	9.00	9.20	8.70	7.60	7.10	6.80	6.20	6.80	11.50	15.10
MAGN	2.30	2.50	2.50	2.30	2.20	1.90	2.10	2.20	3.40	3.70
ILMN	1.00	1.00	1.10	0.90	0.90	0.70	0.90	0.90	1.50	1.70
APAT	0.30	0.30	0.30	0.30	0.30	0.30	0.30	0.30	0.40	0.40

S.DOMINICA MAJORS,TRACES&NORMS(RECALC TO 100 H2O FREE,ALL FE AS FE2O3)

	SD258	SD261	SD262	SD270	SD271	SD275	SD276	SD278	SD283	SD284
PERCENT										
SIO2	56.32	66.28	64.26	55.44	54.96	53.63	63.86	53.10	55.29	63.23
AL2O3	17.94	15.49	16.61	17.68	17.43	17.34	15.68	18.39	17.12	17.65
FE2O3	7.84	5.63	5.78	9.60	9.34	9.21	6.54	9.65	8.70	6.25
MGO	4.48	1.12	1.36	3.60	3.95	5.88	1.41	4.16	4.70	1.75
CAO	8.63	5.86	6.28	8.55	8.76	8.83	5.78	10.02	9.20	5.90
NA2O	2.60	3.14	3.35	2.59	2.62	2.40	3.05	2.48	2.53	3.04
K2O	1.17	1.76	1.60	1.15	1.44	1.29	2.56	0.91	1.24	1.40
TIO2	0.73	0.45	0.47	1.01	1.08	1.02	0.77	0.93	0.85	0.48
MNO	0.15	0.14	0.14	0.17	0.16	0.18	0.15	0.18	0.17	0.15
P2O5	0.14	0.14	0.14	0.20	0.26	0.21	0.20	0.18	0.19	0.15
PPM										
BA	202	272	296	219	243	217	373	165	195	281
NB	1	4	2	2	3	2	3	1	3	2
ZR	83	110	109	124	143	145	221	71	120	98
Y	20	19	21	29	43	31	43	24	31	19
SR	255	255	260	257	320	338	225	282	356	256
RB	40	62	62	52	59	63	127	34	49	36
ZN	65	50	55	87	80	79	66	83	76	60
CU	53	27	22	155	166	172	161	112	106	48
NI	6	3	3	6	19	38	5	8	15	4
CIPW NORM										
CLTZ	10.60	26.30	22.30	10.90	9.00	6.20	21.20	6.90	9.00	22.90
CRTH	7.00	10.40	9.50	6.80	8.60	7.70	15.20	5.40	7.40	8.30
ALBT	22.10	26.70	28.50	22.10	22.30	20.40	25.90	21.10	21.50	25.80
ANOR	34.00	23.10	25.70	33.50	31.80	33.00	21.60	36.60	31.90	28.40
DICP	6.60	4.40	3.90	6.60	8.40	7.90	4.90	10.10	10.40	0.00
HYPR	14.90	5.70	6.70	14.10	13.60	18.80	6.60	14.00	14.30	10.10
MAGN	3.00	2.20	2.20	3.70	3.60	3.60	2.50	3.70	3.40	2.40
ILMN	1.40	0.90	0.90	1.90	2.10	2.00	1.50	1.80	1.60	0.90
APAT	0.30	0.30	0.30	0.50	0.60	0.50	0.50	0.40	0.50	0.40

S.DOMINICA MAJORS,TRACES&NORMS(RECALC TO 100 H2O FREE,ALL FE AS FE2O3)

	SD285	SD288	SD289	SD301	SD304	SD306	SD309	SD312	SD319	SD322
PERCENT										
SIO2	61.25	62.28	63.38	65.90	66.57	65.00	59.69	56.70	49.56	58.61
AL2O3	17.41	17.04	16.20	17.80	16.20	16.14	17.75	17.96	20.09	17.52
FE2O3	6.74	6.70	6.33	5.69	5.36	5.84	7.04	8.46	9.47	8.04
MGO	2.35	2.07	2.01	0.79	1.19	1.06	2.31	3.35	7.15	2.97
CAO	7.34	6.71	6.62	4.75	5.25	6.33	8.19	8.48	9.95	7.83
NA2O	2.82	3.05	2.91	2.57	3.00	3.29	2.79	2.82	2.16	2.72
K2O	1.26	1.28	1.73	1.79	1.73	1.60	1.33	1.14	0.54	1.26
TIO2	0.55	0.56	0.53	0.44	0.44	0.45	0.59	0.75	0.70	0.72
MNO	0.16	0.15	0.15	0.14	0.13	0.14	0.16	0.19	0.18	0.16
P2O5	0.14	0.14	0.14	0.14	0.13	0.14	0.15	0.16	0.21	0.15
PPM										
BA	240	251	273	295	277	276	221	212	122	225
NB	1	3	4	2	2	3	1	6	1	1
ZR	99	104	109	120	106	105	94	102	40	107
Y	20	23	19	23	18	21	17	25	14	24
SR	333	265	238	279	260	261	339	308	350	281
RB	31	34	68	62	55	58	40	42	14	47
ZN	59	65	60	54	48	57	64	66	70	67
CU	43	18	8	25	51	35	44	72	89	45
NI	5	4	4	3	3	4	4	5	6	3
CIPW NORM										
QUTZ	19.40	20.70	21.80	30.90	27.70	23.90	16.70	11.60	0.60	15.30
ORTH	7.50	7.60	10.30	10.60	10.30	9.50	7.90	6.80	3.20	7.50
ALBT	24.00	25.90	24.70	21.80	25.50	28.00	23.70	24.00	18.40	23.20
ANOR	31.30	29.20	26.20	22.70	25.30	24.70	32.10	33.20	43.80	32.10
DICP	3.60	2.60	4.90	0.00	0.00	5.10	6.40	6.70	3.60	5.00
HYPR	10.20	9.80	8.30	7.20	7.80	5.40	9.00	12.70	24.80	12.10
MAGN	2.60	2.60	2.40	2.20	2.10	2.30	2.70	3.30	3.70	3.10
ILMN	1.00	1.10	1.00	0.80	0.80	0.90	1.10	1.40	1.30	1.40
APAT	0.30	0.30	0.30	0.30	0.30	0.30	0.40	0.40	0.50	0.40

S.DOMINICA MAJORS,TRACES&NORMS(RECALC TO 100 H2O FREE,ALL FE AS FE2O3)

	SD330	SD333	SD336	SD339	SD342	SD344A	SD346	SD356	SD358H	SD358X
PERCENT										
SIO2	61.94	62.81	65.42	56.36	62.02	63.47	65.23	64.91	64.70	56.78
AL2O3	17.54	14.97	15.71	17.32	16.75	16.16	15.83	16.43	16.35	19.10
FE2O3	6.34	6.19	5.92	8.67	6.76	6.79	6.12	5.57	5.82	7.70
MGO	0.71	4.92	1.38	3.95	1.97	2.95	1.25	1.22	1.33	3.00
CAO	7.06	6.60	6.10	8.32	7.25	5.91	5.85	6.00	5.85	8.27
NA2O	3.76	2.13	3.16	2.83	3.17	2.17	3.19	3.69	3.63	2.98
K2O	1.63	1.66	1.56	1.33	1.20	1.64	1.71	1.50	1.56	1.02
TIO2	0.65	0.47	0.48	0.86	0.58	0.56	0.51	0.45	0.49	0.75
MNO	0.18	0.12	0.15	0.20	0.16	0.21	0.14	0.14	0.14	0.18
P2O5	0.19	0.13	0.13	0.16	0.15	0.15	0.13	0.09	0.15	0.23
PPM										
BA	290	276	275	216	231	285	267	261	273	183
NB	2	2	4	3	3	4	1	4	4	1
ZR	135	131	108	110	94	132	113	117	112	77
Y	41	24	20	26	17	25	25	22	20	22
SR	305	225	257	255	271	238	256	277	262	336
RB	74	72	54	57	38	69	67	43	50	32
ZN	61	48	57	73	67	54	53	55	56	73
CU	49	29	29	58	43	37	28	31	32	36
NI	1	3	3	3	5	3	3	2	2	4
CIPW NORM										
QUTZ	17.40	21.70	25.10	10.20	19.80	25.20	24.60	22.20	22.20	11.80
CRTH	9.70	9.90	9.30	7.90	7.10	9.70	10.20	8.90	9.30	6.10
ALBT	32.00	18.10	26.90	24.10	27.00	18.50	27.10	31.40	30.80	25.40
ANOR	26.30	26.50	24.20	30.80	28.10	28.50	23.90	23.90	23.80	35.90
DICP	6.60	4.50	4.50	7.90	5.90	0.00	3.90	4.50	3.70	3.10
HYPR	4.00	15.80	6.60	13.60	5.10	13.60	6.70	5.90	6.80	12.80
MAGN	2.40	2.40	2.30	3.30	2.60	2.60	2.40	2.10	2.20	3.00
ILMN	1.20	0.90	0.90	1.60	1.10	1.10	1.00	0.90	0.90	1.40
APAT	0.50	0.30	0.30	0.40	0.40	0.40	0.30	0.20	0.40	0.50

S.DOMINICA MAJORS,TRACES&NORMS(RECALC TO 100 H2O FREE,ALL FE AS FE2O3)

	SD36C	SD361	SD362	SD379	SD382	SD385	SD392H	SD392X	SD396	SD399D
PERCENT										
SIO2	64.44	52.37	62.90	64.11	61.40	65.87	64.32	55.66	59.06	63.99
AL2O3	16.33	21.41	15.69	15.84	17.10	17.18	15.96	18.16	16.24	16.39
FE2O3	5.92	7.13	5.80	6.44	6.84	5.09	5.98	8.54	7.44	6.81
MGO	1.60	3.13	2.93	1.77	1.92	1.24	1.99	3.66	3.88	1.96
CAO	5.98	12.17	6.18	6.50	6.97	5.05	5.96	8.96	7.02	6.04
NA2O	3.42	2.10	2.85	3.15	3.29	3.12	3.20	2.98	3.30	2.43
K2O	1.52	0.85	1.78	1.42	1.58	1.74	1.87	1.04	1.66	1.53
TIO2	0.51	0.54	0.57	0.52	0.59	0.50	0.47	0.69	1.01	0.55
MNO	0.14	0.14	0.15	0.15	0.16	0.11	0.14	0.18	0.17	0.16
P2O5	0.14	0.15	0.16	0.11	0.15	0.11	0.10	0.14	0.22	0.13
PPM										
BA	273	155	285	249	258	290	310	190	317	242
NB	4	3	3	3	2	4	4	4	13	1
ZR	115	61	110	98	116	119	115	62	157	100
Y	25	15	22	22	26	28	46	35	26	18
SR	255	331	245	265	257	233	255	285	400	269
RB	52	23	63	53	62	68	76	31	55	56
ZN	59	45	70	70	63	56	51	65	71	59
CU	35	52	24	31	37	34	40	61	55	31
NI	4	18	2	2	1	5	3	3	29	3
CIPW NORM										
CLTZ	22.50	6.50	19.70	23.00	17.50	26.80	21.80	5.90	12.50	25.80
CRTH	9.00	5.00	10.60	8.40	9.40	10.30	11.10	6.20	9.90	9.10
ALBT	29.10	17.90	24.20	26.80	28.00	26.50	27.20	25.40	28.10	20.70
ANOR	24.80	46.70	24.90	25.00	27.40	24.40	23.80	33.30	24.70	29.30
DICP	3.40	10.70	3.90	5.60	5.30	0.00	4.40	8.60	7.20	0.00
HYPER	7.60	9.10	13.00	7.50	8.30	7.60	8.30	12.70	12.30	11.10
MAGN	2.30	2.80	2.20	2.50	2.60	2.00	2.30	3.30	2.90	2.60
ILMN	1.00	1.00	1.10	1.00	1.10	1.00	0.90	1.30	1.90	1.00
APAT	0.30	0.40	0.40	0.30	0.40	0.30	0.20	0.30	0.50	0.30

S.DOMINICA MAJORS,TRACES&NORMS(RECALC TO 100 H2O FREE,ALL FE AS FE2O3)

	SD399L	SD404	SD406	SD435	SD440	SD446	SD451	SD459	SD461H	SD461X
PERCENT										
SIO2	66.43	60.41	61.64	50.72	48.91	52.88	48.31	63.01	64.58	55.96
AL2O3	15.68	17.89	18.14	19.32	20.03	19.92	20.59	17.13	15.98	18.82
FE2O3	5.99	7.47	6.17	10.64	12.13	9.26	10.80	6.71	6.21	8.56
MGO	1.55	2.39	0.86	4.28	5.54	3.51	4.96	1.77	1.20	2.78
CAO	5.31	6.90	7.35	10.65	11.17	9.77	11.75	6.30	6.44	8.79
NA2O	2.58	2.87	3.26	2.32	2.43	2.78	1.49	2.81	3.27	3.07
K2O	1.70	0.98	1.61	0.62	0.47	0.70	0.66	1.41	1.52	0.85
TIO2	0.47	0.70	0.64	1.07	0.95	0.83	1.08	0.55	0.51	0.78
MNO	0.15	0.19	0.15	0.21	0.19	0.20	0.20	0.16	0.15	0.21
P2O5	0.13	0.20	0.19	0.17	0.18	0.16	0.18	0.14	0.14	0.18
PPM										
BA	279	220	266	134	114	145	147	250	272	163
NB	3	2	1	1	1	1	2	4	3	5
ZR	114	136	141	73	55	75	57	102	108	67
Y	19	29	29	24	18	23	20	20	19	19
SR	267	313	323	304	299	303	324	265	261	304
RB	57	23	70	16	6	17	7	51	54	26
ZN	59	84	71	92	69	84	75	59	54	79
CU	28	31	47	88	39	22	132	40	16	72
NI	3	3	2	11	10	7	8	4	1	4
CIPW NORM										
QLTZ	29.20	19.30	18.80	4.40	0.00	$ 6.30	2.90	23.00	23.50	10.60
CRTH	10.10	5.80	9.60	3.70	2.80	4.20	3.90	8.40	9.00	5.10
ALBT	21.90	24.40	27.70	19.80	20.70	23.70	12.70	23.90	27.80	26.10
ANCR	25.60	33.10	30.20	40.80	42.70	43.10	47.90	30.10	24.90	35.30
DICP	0.00	0.00	4.40	9.30	9.80	6.30	7.90	0.30	5.60	6.20
HYPR	9.40	12.70	5.30	15.40	17.40	14.00	18.00	10.40	5.80	11.60
MAGN	2.30	2.90	2.40	4.10	3.90	3.60	4.20	2.60	2.40	3.30
ILMN	0.90	1.30	1.20	2.00	1.80	1.60	2.10	1.00	1.00	1.50
APAT	0.30	0.50	0.50	0.40	0.40	0.40	0.40	0.30	0.30	0.40

$ Contains 0.5% olivine.

S.DOMINICA MAJORS,TRACES&NORMS(RECALC TO 100 H2O FREE,ALL FE AS FE2O3)

	SD464	SD465	SD469	SD471
PERCENT				
SIO2	60.12	59.91	64.75	63.83
AL2O3	17.13	16.96	15.91	16.12
FE2O3	7.37	7.76	5.84	6.16
MGO	3.05	2.83	1.69	1.95
CAO	7.28	7.42	6.13	6.54
NA2O	2.94	2.78	3.39	3.22
K2O	1.18	1.33	1.56	1.38
TIO2	0.63	0.70	0.48	0.52
MNO	0.17	0.15	0.14	0.15
P2O5	0.12	0.13	0.14	0.14
PPM				
BA	231	238	267	256
NB	4	4	3	2
ZR	96	101	116	106
Y	19	21	22	22
SR	316	254	263	266
RB	40	49	55	50
ZN	69	65	58	62
CU	53	70	34	48
NI	5	3	3	3
CIPW NORM				
QUTZ	16.90	17.20	22.80	22.20
ORTH	7.00	7.90	9.30	8.20
ALBT	25.00	23.70	28.80	27.40
ANOR	30.20	30.00	23.70	25.60
DIOP	4.40	5.10	5.00	5.10
HYPER	12.10	11.50	7.00	7.90
MAGN	2.60	3.00	2.30	2.40
ILMN	1.20	1.30	0.90	1.00
APAT	0.30	0.30	0.30	0.30

S.DOMINICA SORTED PYROCLASTICS (TOTALS & FE AS FEFORE)

	SD44C	SD44M	SD44F	SD48C	SD48M	SD48F	SD93C	SD93M	SD93F	SD238C
PERCENT										
SIO2	53.11	51.77	52.40	63.51	61.74	62.61	60.53	54.80	62.22	65.27
AL2O3	18.57	18.48	19.31	16.75	16.30	16.43	19.30	20.59	19.46	15.78
FE2O3	11.41	11.33	12.09	6.11	7.40	7.14	6.98	9.37	7.17	5.99
MGO	1.71	1.01	0.53	1.86	3.13	2.47	1.30	3.35	0.53	1.15
CAO	9.46	9.97	8.78	6.46	6.32	6.47	6.84	7.81	5.80	6.00
NA2O	3.51	5.34	4.58	3.03	2.90	2.58	2.95	2.44	2.49	3.29
K2O	0.61	0.55	0.64	1.51	1.32	1.40	1.19	0.67	1.37	1.74
TIO2	1.29	1.26	1.29	0.49	0.53	0.62	0.56	0.61	0.67	0.48
MNO	0.18	0.18	0.25	0.15	0.19	0.16	0.17	0.24	0.16	0.15
P2O5	0.14	0.13	0.13	0.14	0.16	0.12	0.19	0.13	0.13	0.14
PPM										
BA	84	73	121	275	241	241	281	216	343	268
NB	3	2	1	4	4	3	2	4	4	5
ZR	69	67	74	107	103	119	122	102	182	116
Y	20	22	26	21	20	20	24	25	41	23
SR	259	261	246	261	255	256	273	287	225	255
RB	27	28	28	57	54	60	36	19	48	64
ZN	82	84	104	63	82	86	70	99	80	58
CU	140	164	264	33	79	167	30	47	83	43
NI	4	7	7	4	4	5	1	5	2	2
CIPW NORM										
QUTZ	6.40	0.00	2.10	22.20	19.60	22.70	20.00	12.80	26.90	24.10
CRTH	3.60	3.30	3.80	9.00	7.80	8.30	7.10	4.00	8.10	10.30
ALBT	30.00	39.50	39.10	25.80	24.70	21.90	25.10	20.80	21.20	28.00
ANOR	33.40	25.00	30.50	27.80	27.70	29.30	32.90	38.20	28.10	23.30
DICP	11.10	20.70	11.00	2.90	2.30	1.80	0.00	0.00	0.00	4.80
HYPR	8.30	0.00	6.00	8.80	13.80	11.70	9.60	17.20	7.70	5.90
MAGN	4.40	4.40	4.70	2.40	2.90	2.80	2.70	3.60	2.80	2.30
ILMN	2.50	2.40	2.50	0.90	1.00	1.20	1.10	1.20	1.30	0.90
APAT	0.30	0.30	0.30	0.30	0.40	0.30	0.50	0.30	0.30	0.30

S.DOMINICA SORTED PYROCLASTICS (TOTALS & FE AS BEFORE)

	SD238M	SD238F	SD239A	SD239B	SD239C	SD239D	SD239E	SD239F	SD245C	SD245M
PERCENT										
SIO2	58.37	71.68	64.97	64.04	62.60	62.51	62.97	70.42	65.65	64.07
AL2O3	16.22	14.15	16.24	16.04	16.20	17.15	17.48	15.02	16.26	16.42
FE2O3	9.70	4.26	5.82	6.41	7.31	6.09	5.48	3.46	5.17	6.03
MGO	4.07	0.01	1.22	1.80	2.13	1.61	1.11	0.11	0.93	1.50
CAO	6.81	3.83	6.12	6.05	6.25	7.08	7.32	4.73	5.90	6.08
NA2O	2.78	3.03	3.30	3.30	3.17	3.37	3.45	3.61	3.68	3.58
K2O	1.03	2.45	1.56	1.51	1.43	1.39	1.41	2.12	1.71	1.57
TIO2	0.58	0.39	0.49	0.54	0.56	0.51	0.55	0.34	0.42	0.45
MNO	0.27	0.09	0.14	0.15	0.19	0.15	0.12	0.07	0.13	0.15
P2O5	0.18	0.12	0.15	0.16	0.17	0.15	0.11	0.11	0.14	0.15
PPM										
BA	192	359	274	263	252	243	247	336	286	267
NB	1	2	6	2	1	3	4	5	5	3
ZR	70	172	113	108	99	88	102	158	124	114
Y	18	27	20	21	17	16	19	23	21	20
SR	263	190	264	257	247	294	307	232	267	263
RB	38	100	61	57	50	46	49	84	60	55
ZN	101	54	57	71	79	64	56	43	51	64
CU	44	195	27	32	42	41	48	56	23	37
NI	4	3	3	4	4	3	2	3	2	3
CIPW NORM										
QLTZ	14.80	35.30	24.00	22.30	20.50	19.40	20.00	30.90	23.20	21.10
CRTH	6.10	14.50	9.30	9.00	8.50	8.20	8.40	12.60	10.10	9.30
ALBT	23.70	25.70	28.00	28.10	27.00	28.60	29.30	30.60	31.30	30.40
ANCR	28.90	17.80	25.00	24.60	25.90	27.70	28.20	18.60	22.90	24.20
DICP	3.20	0.40	3.80	3.80	3.50	5.50	6.40	3.70	4.70	4.30
HPER	17.90	3.60	6.40	8.40	10.30	6.80	4.30	1.30	4.60	7.20
MAGN	3.70	1.60	2.20	2.50	2.80	2.30	2.10	1.30	2.00	2.30
ILMN	1.10	0.70	0.90	1.00	1.10	1.00	1.00	0.60	0.80	0.90
APAT	0.40	0.30	0.40	0.40	0.40	0.40	0.30	0.30	0.30	0.40

S.DOMINICA SORTED PYROCLASTICS (TOTALS & FE AS FEFORE)

	SD245F	SD264C	SD265A	SD265B	SD265C	SD265D	SD265E	SD265F	SD266C	SD286C
PERCENT										
SIO2	67.36	65.03	63.59	64.69	67.40	56.03	55.77	75.15	65.78	61.53
AL2O3	15.99	15.91	16.22	15.96	15.06	17.01	15.67	11.51	15.71	19.13
FE2O3	4.27	6.47	7.10	6.68	6.16	10.58	13.03	5.80	5.99	7.02
MGO	0.70	1.26	2.39	1.72	1.38	4.58	4.55	1.16	0.88	1.57
CAO	5.51	6.10	5.91	5.91	5.16	7.77	7.20	3.31	5.84	5.97
NA2O	3.72	2.81	2.51	2.59	2.44	2.37	1.41	1.17	3.19	2.78
K2O	1.84	1.62	1.38	1.62	1.66	0.59	0.56	1.26	1.86	1.13
TIO2	0.36	0.52	0.60	0.57	0.52	0.63	1.41	0.38	0.47	0.57
MNO	0.10	0.15	0.18	0.15	0.14	0.28	0.25	0.12	0.15	0.15
P2O5	0.13	0.12	0.11	0.10	0.08	0.15	0.14	0.13	0.13	0.15
PPM										
BA	308	243	252	268	285	132	119	159	267	265
NB	5	4	3	4	3	1	4	4	4	2
ZR	143	116	120	124	123	45	51	106	120	114
Y	22	19	23	20	20	13	17	20	20	17
SR	250	257	245	226	214	266	225	132	248	274
RB	70	61	59	70	75	15	22	76	63	33
ZN	53	67	96	98	80	110	125	96	62	69
CU	92	17	45	28	39	20	39	159	2	30
NI	4	3	2	2	3	4	5	5	3	3
CIPW NORM										
QUTZ	25.60	26.10	25.00	26.20	31.60	13.20	18.70	52.80	25.40	23.60
CRTH	10.90	9.60	8.20	9.60	9.90	3.50	3.30	7.50	11.00	6.70
ALBT	31.60	23.90	21.40	22.00	20.70	20.20	12.00	9.90	27.10	23.60
ANOR	21.60	26.10	28.60	27.30	25.20	34.30	35.10	15.60	23.20	28.60
DICP	4.30	2.90	0.00	1.30	0.00	2.90	0.00	0.00	4.30	0.00
HYPR	3.40	7.60	12.40	9.70	9.00	20.10	22.70	8.30	5.50	10.30
MAGN	1.60	2.50	2.70	2.60	2.40	4.10	5.00	2.20	2.30	2.70
ILMN	0.70	1.00	1.10	1.10	1.00	1.20	2.70	0.70	0.90	1.10
APAT	0.30	0.30	0.30	0.20	0.20	0.40	0.30	0.30	0.30	0.40

S.DOMINICA SORTED PYROCLASTICS (TOTALS & FE AS BEFORE)

	SD286F	SD290C	SD290F	SD291C	SD292C	SD293C	SD294C	SD300C	SD308C	SD308F
PERCENT										
SIO2	54.45	62.81	63.05	63.29	62.03	64.94	62.39	55.48	65.88	68.05
AL2O3	29.58	16.64	16.46	16.19	16.42	19.39	21.52	19.21	15.80	15.77
FE2O3	8.16	6.58	9.27	6.40	7.04	7.10	7.98	9.21	5.41	4.27
MGO	0.70	1.93	1.10	1.84	2.56	2.03	0.01	3.08	1.35	0.57
CAO	4.11	6.74	5.10	6.91	6.81	2.51	3.13	8.27	5.98	5.89
NA2O	1.28	2.74	1.92	2.91	2.80	1.45	2.75	2.72	3.18	3.29
K2O	0.60	1.71	2.16	1.62	1.41	1.59	1.14	0.89	1.69	1.60
TIO2	0.71	0.58	0.61	0.54	0.64	0.79	0.88	0.76	0.43	0.33
MNO	0.23	0.15	0.17	0.15	0.15	0.09	0.14	0.21	0.14	0.09
P2O5	0.19	0.12	0.14	0.14	0.13	0.13	0.06	0.17	0.14	0.14
PPM										
BA	235	259	276	271	236	256	244	185	281	264
NB	4	2	2	2	1	5	5	2	3	3
ZR	162	107	135	110	106	110	118	91	112	132
Y	33	21	21	21	28	19	18	24	20	21
SR	314	236	178	246	236	285	167	281	255	257
RB	19	58	62	63	57	71	38	25	58	69
ZN	150	60	89	58	69	63	78	81	48	97
CU	339	42	368	23	65	65	125	46	33	152
NI	6	3	5	3	4	2	6	4	5	2
CIPW NORM										
QLTZ	32.20	21.80	27.70	22.00	20.60	39.90	32.60	11.20	25.40	29.10
CRTH	3.60	10.20	12.90	9.60	8.40	9.40	6.80	5.30	10.00	9.50
ALBT	10.90	23.30	16.40	24.70	23.80	12.30	23.40	23.20	27.00	27.90
ANCR	19.30	28.20	24.60	26.50	28.20	11.70	15.20	37.80	23.90	23.60
DICP	0.00	3.80	0.00	5.90	4.00	0.00	0.00	2.00	4.10	4.10
HYPER	9.20	8.80	11.40	7.50	10.70	11.00	6.80	15.10	6.30	3.20
MAGN	3.10	2.50	3.60	2.50	2.70	2.70	3.10	3.60	2.10	1.60
ILMN	1.40	1.10	1.20	1.00	1.20	1.50	1.70	1.50	0.80	0.60
APAT	0.50	0.30	0.30	0.30	0.30	0.30	0.10	0.40	0.30	0.30

S.DOMINICA SORTED PYROCLASTICS (TOTALS & FE AS BEFORE)

	SD311C	SD311F	SD345C	SD345F	SD348C	SD357C	SD357F
PERCENT							
SIO2	58.26	59.43	66.86	70.97	64.67	65.89	66.88
AL2O3	18.08	19.76	15.47	15.71	17.24	15.95	16.85
FE2O3	7.68	7.24	5.77	3.92	6.75	5.41	4.51
MGO	2.91	1.81	0.51	0.01	1.20	1.12	0.62
CAO	8.26	6.85	5.66	3.27	5.55	5.80	5.03
NA2O	2.68	2.68	3.18	3.10	2.11	3.46	3.54
K2O	1.18	1.21	1.82	2.49	1.64	1.68	1.91
TIO2	0.64	0.71	0.49	0.36	0.56	0.43	0.43
MNO	0.17	0.15	0.14	0.08	0.16	0.13	0.09
P2O5	0.14	0.14	0.11	0.09	0.11	0.13	0.14
PPM							
BA	203	304	254	329	283	277	308
NB	6	3	5	4	1	2	2
ZR	94	139	120	180	123	108	146
Y	19	27	24	37	31	22	25
SR	354	360	247	160	216	266	238
RB	42	42	65	100	69	48	66
ZN	72	83	51	78	66	49	51
CU	55	254	36	259	45	24	81
NI	6	4	4	1	3	3	2
CIPW NORM							
QUTZ	14.80	19.50	27.60	35.20	30.10	24.50	26.00
CRTH	7.00	7.20	10.80	14.80	9.70	10.00	11.30
ALBT	22.80	22.80	27.00	26.30	17.90	29.40	30.10
ANOR	34.00	33.30	22.70	15.70	27.00	23.10	24.10
DICP	5.20	0.00	4.20	0.00	0.00	4.10	0.00
HPER	11.70	10.90	4.30	3.50	9.10	5.60	5.90
MAGN	3.00	2.80	2.20	1.50	2.60	2.10	1.70
ILMN	1.20	1.40	0.90	0.70	1.10	0.80	0.80
APAT	0.30	0.30	0.30	0.20	0.30	0.30	0.30

S.DOMINICA SULPHUR RICH SPECIMENS (TOTALS & FE AS BEFORE)

	SD112	SD196	SD197	SD314	SD315	SD316	SD317	SD318	SD327	SD331
PERCENT										
SIO2	61.59	61.55	62.16	55.67	57.04	58.60	56.68	55.72	56.19	64.35
AL2O3	16.98	15.72	16.04	17.71	15.88	16.89	18.15	16.37	17.17	15.47
FE2O3	6.86	6.00	7.29	5.59	8.32	7.52	8.52	9.22	9.31	6.36
MGO	1.78	3.54	2.52	3.96	5.41	3.89	2.91	6.31	3.07	1.77
CAO	6.85	6.20	5.72	8.02	8.96	7.89	8.17	7.77	8.13	6.66
NA2O	3.11	2.72	2.46	2.15	2.03	2.62	3.06	2.08	3.00	2.46
K2O	1.34	1.43	1.33	0.73	0.19	1.38	1.06	0.98	1.06	1.74
TIO2	0.60	0.58	0.66	0.70	0.71	0.72	0.92	0.72	0.82	0.53
MNO	0.15	0.15	0.27	0.13	0.19	0.15	0.18	0.23	0.52	0.17
S	0.57	1.94	1.37	5.11	1.08	0.16	0.18	0.41	0.54	0.35
P2O5	0.16	0.16	0.17	0.23	0.19	0.18	0.18	0.18	0.18	0.13
PPM										
BA	227	256	226	240	70	261	206	196	196	282
NB	6	8	4	1	2	3	1	4	1	1
ZR	106	101	114	130	132	127	95	111	81	134
Y	21	19	18	25	28	28	26	24	26	27
SR	277	259	241	275	247	276	313	242	288	242
RB	42	48	48	24	2	61	39	35	38	70
ZN	82	67	71	82	66	61	87	70	77	52
CU	19	14	56	57	7	47	119	74	40	54
NI	1	4	3	6	4	3	1	4	3	2
CIPW NORM										
QUTZ	20.20	21.90	25.30	18.40	17.30	14.70	11.80	11.90	11.50	25.90
ORTH	8.00	8.50	7.90	4.30	1.10	8.20	6.30	5.80	6.30	10.30
ALBT	26.50	23.10	20.90	18.30	17.30	22.20	26.10	17.70	25.60	20.90
ANOR	28.60	26.60	27.40	36.70	33.90	30.40	32.90	32.70	30.50	26.20
DIOP	3.80	2.60	0.00	1.40	7.80	6.30	5.60	4.00	7.40	5.20
HPER	7.80	9.80	10.80	9.30	15.60	13.00	11.60	21.70	12.10	7.10
MAGN	2.70	2.30	2.80	4.30	3.20	2.90	3.30	3.60	3.60	2.50
ILMN	1.20	1.10	1.30	1.30	1.40	1.40	1.80	1.40	1.60	1.00
APAT	0.40	0.40	0.40	0.60	0.50	0.40	0.40	0.40	0.40	0.30
PYRT	1.10	3.70	2.60	9.60	2.00	0.30	0.30	0.80	1.00	0.70

S.DOMINICA ALTERED & NON VOLCANIC SPECIMENS (TOTALS & FE AS BEFORE)

	SD31	SD57	SD134	SD216	SD217	SD298	SD332	SD353	SD355	SD386
PERCENT										
SIO2	79.17	52.69	68.76	58.49	64.14	0.01	0.01	46.91	50.75	71.80
AL2O3	0.61	23.20	13.02	17.32	16.65	0.01	0.01	38.05	34.56	13.84
FE2O3	19.77	10.08	4.12	10.12	5.62	2.93	2.34	13.68	12.65	4.58
MGO	0.01	3.77	1.08	2.64	1.74	0.01	2.41	0.01	0.01	1.03
CAO	0.01	8.27	6.87	7.67	6.25	95.28	82.60	0.26	0.24	3.98
NA2O	0.31	0.92	5.03	2.04	3.27	0.01	11.09	0.01	0.43	2.14
K2O	0.01	0.00	0.49	0.47	1.59	0.98	0.62	0.29	0.30	1.73
TIO2	0.05	0.85	0.39	0.84	0.47	0.04	0.07	0.70	0.89	0.70
MNO	0.04	0.13	0.14	0.23	0.15	0.16	0.14	0.07	0.15	0.09
P2O5	0.05	0.08	0.10	0.17	0.13	0.59	0.73	0.04	0.03	0.12
PPM										
BA	1	58	65	176	263	20	48	208	113	269
NB	5	6	5	6	5	3	1	3	5	4
ZR	1	33	118	81	107	257	7	133	119	122
Y	7	13	27	36	16	1	1	16	23	25
SR	1	237	330	241	265	507	299	38	22	215
RB	2	3	5	38	51	1	1	3	5	64
ZN	1	61	90	92	56	1	1	58	79	50
CL	1	107	60	87	45	1	1	100	85	22
NI	1	20	5	8	7	1	1	25	4	4

S.DOMINICA ALTERED & NON VOLCANIC SPECIMENS (TOTALS & FE AS BEFORE)

	SD398	SD403	SD454
PERCENT			
SIO2	0.71	16.59	0.01
AL2O3	0.01	6.88	0.01
FE2O3	4.19	8.88	3.57
MGO	8.42	22.11	0.01
CAO	85.18	41.27	94.27
NA2O	0.01	0.01	0.01
K2O	0.76	0.60	0.99
TIO2	0.11	0.78	0.08
MNO	0.65	0.38	0.33
P2O5	0.70	0.51	0.76
PPM			
BA	13	74	66
NB	1	1	1
ZR	13	89	6
Y	1	14	1
SR	584	1298	313
RB	1	7	3
ZN	1	46	1
CU	1	41	1
NI	4	16	1

APPENDIX 1:4

A GUIDE TO DOMINICA VOLCANIC MINERAL ANALYSES

This appendix is intended as a 'route map' for the mineral analyses listed in appendix 1:5. It can be used to locate the available analyses of any mineral in any specimen. It may also be used to visualise mineral assemblages, and to find if analyses of coexisting minerals are available. The numbers in each column, which indicate that an analysis is available, are the same as those at the head of each analysis in the lists of appendix 1:5.

APENDIX 1.4 LIST OF DOMINICA VOLCANIC MINERAL ANALYSES.

THE NUMBERS IN EACH COLUMN REFER TO A PARTICULAR MINERAL ANALYSIS IF MORE THAN ONE ANALYSIS PER MINERAL PER SPECIMEN WAS MADE THEN THEY ARE GIVEN AS 1-3 WHICH REFERS TO ANALYSES 1,2 AND 3

THE LISTS ARE GIVEN IN APENDIX 1.5 IN THE ORDER INDICATED 1-6

KEY

SPEC NO	=HAND SPECIMEN NUMBER (SEE APENDIX 1.1)	
PROBE NO	=NUMBER ALLOTTED TO POLISHED THIN SECTION DURING PROBE ANALYSIS	
PLAG	=PLAGIOCLASE	LIST 1
AMPH	=AMPHIBOLE	LISTS 2A+2B
CLPX	=CLINOPYROXENE	LIST 3
ORPX	=ORTHOPYROXENE	LIST 4
OLIV	=OLIVINE	LIST 5
MAGN	=MAGNETITE	LISTS 6A+6B
A	=ABSENT	
ND	=NOT DETERMINED	

SPEC NO	PROBE NO	PLAG LIST 1	AMPH LIST 2A	CLPX LIST 3	ORPX LIST 4	OLIV LIST 5	MAGN LIST 6A
SD4	P4	1+2	1	1	1	A	ND
SD9	P9	3-5	2	2	2	A	ND
SD11	P11	6-8	3	3	3+4	A	1
SD25	L25	9-11	A	4	5+6	A	2
SD46	L46	12+13	4	5+6	7	1	3
SD47	L47	14+15	5	7	8	A	ND
SD135	L135	16+17	A	8+9	9	2	ND
SD150	F150	18+19	A	10	10	3	ND
SD164	F164	20+21	6	11	11	A	ND
SD165	F165	22-24	7	12+13	12+13	ND	4
SD169	F169	25-27	A	14	14	4	ND
SD173	F173	28+29	A	15	15	5	ND
SD174	F174	30-32	A	16+17	16	6	ND
SD181	F181	33+34	A	18+19	A	7	5
SD188	A188	35-37	A	20	A	8+9	6
SD278	T278	38-40	A	21-23	17+18	10	ND
SD366B	F366B	41+42	A	24	19	11	ND
SD375B	F375B	43+44	A	25	20	12	ND
SD440	F440	45+46	A	26	21	13	ND
SD451	F451	47-49	A	27	A	14+15	ND

APPENDIX TABLE 1

OPTIMUM ANALYSING CONDITIONS AND STANDARDS USED FOR ELECTRON MICROPROBE ANALYSIS

Z	Element	Line	Analysing Crystal	Counter	2θ(Peak)	2θ(Background)	Standard
11	Na	K_{α_1}	K.A.P.	Flow	53°14'	+1° 30'	Jadeite (JD-1)
12	Mg	"	"	"	43°42'	-2°	MgO
13	Al	"	"	"	36°32'	±2°	Al_2O_3
14	Si	"	"	"	31°02'	-1° + 1°30'	Wollastonite (WO-2)
19	K	"	Quartz	"	67°58'	-2°	Orthoclase (AF-15)
20	Ca	"	LiF	"	113°02'	-2°	Wollastonite (WO-2)
22	Ti	"	"	"	86°05'	+2°	TiO_2
23	V*	"	"	"	76°52'	± 15'	V_2O_3
24	Cr	"	"	Sealed	69°16'	+2°	Cr_2O_3
25	Mn	"	"	"	62°48'	+2°	Mn
26	Fe	"	"	Flow	57°20'	+2°	Fe
28	Ni	"	"	Sealed	48°34'	+2°	Ni

NOTES Names in brackets are University of Durham standard names. * Slits used because of interference with TiK_β

APPENDIX 1:5

ELECTRON MICROPROBE MINERAL ANALYSIS

Techniques and analytical conditions.

Samples were prepared as polished thin sections and whenever possible samples and standards were carbon-coated simultaneously to ensure a uniform thickness of carbon. Samples and standards were cleaned and recoated frequently to avoid deterioration of the carbon coating. Whilst not in use, the samples and standards were stored in a dessicator.

The instrument used in the University of Durham is a Cambridge Instrument Company "Geoscan-Mk II" and general techniques employed are those suggested by Sweatman and Long (1969). The standards, and analysing conditions used are given in appendix Table 1. The mineral groups were analysed with an accelerating voltage of 15kV and a specimen current of 0.04μA. For interstitial glasses in the plutonic nodules, the electron beam was diffused and the specimen current reduced to 0.02μA.

The "Geoscan" has two spectrometers and four pre-set spectrometer positions. In general two elements were determined simultaneously with pre-set peaks and backgrounds for each element. For all analyses it was possible to complete the analysis on the same spot. In a few cases some elements were checked at a later date, a return to the same spot was facilitated by the use of whole-plate photographs, and the recognition of burn marks on the carbon coating. The photographs were also useful for indicating the points to analyse, in locating them

when the specimen was inside the specimen chamber, and afterwards as a reference of the spot analysed.

Corrections to the measured counts were made with the aid of an on-line Varian 620-100 computer, by the program "TIM3" written by Dr A. Peckett. This had the great advantage of producing the corrected analysis a few seconds after its completion, consequently spurious analyses could be repeated immediately and much time was saved. The Varian computer storage space was limited so that a maximum of 9 elements could be dealt with at one time. This was usually more than sufficient for the present purposes. Most analyses were carried out in the following stages to facilitate data input into the computer:

1. 6 or more 10 second counts on each standard peak
2. 4 or more 10 second counts on standard backgrounds
3. 4 or more 10 second counts on unknown backgrounds
4. check standard peak angles and count rates
5. 4 or more 10 second counts on 1 unknown
6. Calculate result of analysis
7. If satisfactory do N unknowns, if not return to stage 4 etc.

The value of N was very variable depending on the stability of the machine. It was frequently only 1, but on some occasions, particularly during the night, as many as 10 analyses could be obtained without repeating standard peak measurements.

The smallest possible diameter for the electron beam is theoretically 1 μm, but the area excited in the sample is somewhat greater than this.

In general the resolution is considered to be between 2 and 5 μm. Detection limits can be calculated from the formula:

$$\frac{3}{M}\sqrt{Rb/Tb}$$

where M = mean peak counts/sec/%

Rb= mean background cps

Tb= counting time on background.

Calculated detection limits are in the range 200-500ppm (0.02 to 0.05%). The overall accuracy taking into account counting precision and uncertainties in the correction procedure is in the order of $\pm$ 2% of the amount of the major constituents present. Elements present in quantities below about 3-5% have a somewhat lower accuracy.

The corrected probe analyses were recast into their atomic proportions and end member compositions with the aid of the versatile computer program "TABLIT" developed by Mr E.B. Curran. This program was also useful for calculating the theoretical Fe^{3+}/Fe^{2+} distribution in spinels after the method of Carmichael (1967).

DOMINICA VOLCANIC MINERAL ANALYSES

This appendix contains mineral analyses from volcanic specimens listed in the order indicated in appendix 1:4 - which may be consulted if a particular analysis is required. For most minerals, the atomic proportions, based on the number of oxygens in the unit cell, and end-member compositions are also given. Amphiboles and spinels are listed twice, lists 2A and 6A present the original probe analyses,whilst in lists 2B and 6B an attempt has been made to distribute the Fe between Fe^{2+} and Fe^{3+}. This was first done for the plutonic analyses,and the method is described on page 114.

The identifiers underneath the analysis-reference number give additional information. The half before the dash is the specimen probe number, this is followed by letters which are explained below:

C	=	Core of phenocryst
R	=	Rim of phenocryst
G	=	Groundmass mineral
P	=	Plagioclase
A	=	Amphibole
L	=	Clinopyroxene
R	=	Orthopyroxene
OL	=	Olivine phenocryst
OG	=	Olivine in groundmass
M	=	Magnetite

other symbols used

-	=	not present
ND	=	not determined
TR	=	present in trace amounts

DOMINICA VOLCANICS - LIST 1 - PLAGICCLASES

	1	2	3	4	5	6	7	8	9	10
	P4-PC	P4-PR	P9-PC	P9-PR	P9-PG	P11-PC	P11-PR	P11-PG	L25-PC	L25-PR
OXIDE WEIGHT PERCENTAGE										
SIO2	55.30	54.36	45.30	55.45	53.99	50.90	57.10	53.11	55.78	55.56
AL2O3	27.79	28.23	34.20	28.29	28.34	30.94	26.52	28.32	27.76	27.15
FEO	0.25	0.30	0.26	0.20	0.30	0.26	0.30	0.29	0.18	0.22
CAO	10.77	11.19	18.28	10.47	12.14	14.11	9.90	12.44	10.39	10.38
K2O	0.16	0.19	TR.	0.20	0.19	0.08	0.19	0.13	0.31	0.34
NA2O	5.13	4.84	1.09	4.99	4.80	3.08	5.52	4.97	4.96	5.05
TOTAL	99.40	99.11	99.13	99.60	99.76	99.37	99.53	99.26	99.38	98.70
ATOMIC PROPORTIONS ON THE BASIS OF 8 OXYGENS										
SI	2.505	2.475	2.107	2.502	2.452	2.328	2.574	2.431	2.522	2.532
AL	1.484	1.515	1.876	1.505	1.517	1.668	1.410	1.528	1.480	1.459
FE2	0.009	0.011	0.010	0.008	0.011	0.010	0.011	0.011	0.007	0.008
CA	0.523	0.546	0.911	0.506	0.591	0.692	0.478	0.610	0.503	0.507
K	0.009	0.011	0.000	0.012	0.011	0.005	0.011	0.008	0.018	0.020
NA	0.451	0.427	0.098	0.437	0.423	0.273	0.483	0.441	0.435	0.446
END MEMBER COMPOSITIONS										
AB	45.86	43.42	9.74	45.76	41.27	28.19	49.67	41.67	45.49	45.88
AN	53.19	55.46	90.26	53.04	57.66	71.33	49.21	57.62	52.64	52.09
OR	0.94	1.12	0.00	1.21	1.07	0.48	1.12	0.72	1.87	2.03

DOMINICA VOLCANICS - LIST 1 - PLAGIOCLASES

	11	12	13	14	15	16	17	18	19	20
	L25-PG	L46-PC	L46-PR	L47-PC	L47-PR	L135-PC	L135-PR	F150-PC	F150-PR	F164-PC
OXIDE WEIGHT PERCENTAGE										
SIO2	55.80	46.19	49.17	49.72	56.46	44.57	48.95	44.65	50.72	53.94
AL2O3	27.31	33.60	31.36	31.22	27.26	34.61	31.56	34.26	30.34	28.28
FEO	0.28	0.48	0.55	0.24	0.24	0.43	0.49	0.55	0.65	0.30
CAO	10.34	17.80	15.36	15.01	10.47	19.27	15.24	18.77	13.75	12.02
K2O	0.40	0.03	0.07	0.07	0.19	0.04	0.08	TR.	0.08	0.18
NA2O	5.53	1.42	2.62	3.03	5.33	0.69	2.74	0.82	3.55	4.51
TOTAL	99.66	99.52	99.13	99.29	99.95	99.61	99.06	99.05	99.09	99.23
ATOMIC PROPORTIONS ON THE BASIS OF 8 OXYGENS										
SI	2.524	2.140	2.270	2.287	2.540	2.072	2.261	2.086	2.334	2.458
AL	1.457	1.835	1.707	1.693	1.446	1.897	1.719	1.887	1.646	1.520
FE2	0.011	0.019	0.021	0.009	0.009	0.017	0.019	0.021	0.025	0.011
CA	0.501	0.884	0.760	0.740	0.505	0.960	0.754	0.940	0.678	0.587
K	0.023	0.002	0.004	0.004	0.011	0.002	0.005	0.000	0.005	0.010
NA	0.485	0.128	0.235	0.270	0.465	0.062	0.246	0.074	0.317	0.399
END MEMBER COMPOSITIONS										
AB	48.06	12.60	23.49	26.65	47.42	6.07	24.44	7.33	31.70	40.02
AN	49.65	87.23	76.09	72.94	51.46	93.70	75.09	92.67	67.83	58.93
OR	2.29	0.18	0.41	0.41	1.11	0.23	0.47	0.00	0.47	1.05

DOMINICA VOLCANICS - LIST 1 - PLAGIOCLASES

	21	22	23	24	25	26	27	28	29	30
	F164-PR	F165-PC	F165-PR	F165-PG	F169-PC	F169-PR	F169-PX	F173-PC	F173-PR	F174-PC
OXIDE WEIGHT PERCENTAGE										
SIO2	58.62	50.95	52.87	53.64	47.23	50.52	43.78	44.29	50.51	44.57
AL2O3	25.92	30.61	29.39	28.32	32.98	29.88	35.11	34.65	30.38	34.10
FEO	0.17	0.38	0.33	0.30	0.64	0.77	0.35	0.52	0.70	0.61
CAO	8.28	14.67	12.59	12.28	17.00	14.45	19.65	19.02	13.94	18.81
K2O	0.28	0.08	0.12	0.16	0.03	0.08	0.02	0.02	0.07	0.03
NA2O	6.02	3.08	3.99	4.51	1.72	3.03	0.41	0.77	3.59	0.87
TOTAL	99.29	99.77	99.29	99.21	99.60	98.73	99.32	99.27	99.19	98.99
ATOMIC PROPORTIONS ON THE BASIS OF 8 OXYGENS										
SI	2.633	2.327	2.411	2.448	2.181	2.336	2.043	2.067	2.325	2.085
AL	1.372	1.649	1.580	1.524	1.796	1.629	1.932	1.906	1.649	1.881
FE2	0.006	0.015	0.013	0.011	0.025	0.030	0.014	0.020	0.027	0.024
CA	0.399	0.718	0.615	0.601	0.841	0.716	0.983	0.951	0.688	0.943
K	0.016	0.005	0.007	0.009	0.002	0.005	0.001	0.001	0.004	0.002
NA	0.524	0.273	0.353	0.399	0.154	0.272	0.037	0.070	0.321	0.079
END MEMBER COMPOSITIONS										
AB	55.85	27.41	36.19	39.56	15.45	27.38	3.64	6.82	31.67	7.71
AN	42.44	72.12	63.09	59.51	84.37	72.14	96.25	93.06	67.93	92.11
OR	1.71	0.47	0.72	0.92	0.18	0.48	0.12	0.12	0.41	0.17

DOMINICA VOLCANICS - LIST 1 - PLAGIOCLASES

	31	32	33	34	35	36	37	38	39	40
	F174-PR	F174-PG	F181-PC	F181-PR	A188-PC	A188-PR	A188-PG	T278-PC	T278-PR	T278-PG
OXIDE WEIGHT PERCENTAGE										
SIO2	51.77	52.63	43.46	48.36	45.31	52.44	57.68	45.84	48.29	54.66
AL2O3	29.38	29.28	34.99	31.95	33.86	28.44	26.75	33.54	32.62	27.04
FEO	0.61	0.60	0.43	0.80	0.56	0.92	0.77	0.57	0.92	1.05
CAO	13.39	13.00	19.67	16.10	18.35	13.11	8.82	18.24	16.37	11.43
K2O	0.11	0.12	TR.	0.06	0.03	0.14	0.42	0.04	0.06	0.31
NA2O	3.83	4.22	0.39	2.33	0.93	4.06	5.44	1.22	1.98	5.27
TOTAL	99.09	99.85	98.94	99.60	99.04	99.11	99.88	99.45	100.24	99.76
ATOMIC PROPORTIONS ON THE BASIS OF 8 OXYGENS										
SI	2.378	2.397	2.038	2.230	2.113	2.411	2.588	2.129	2.213	2.490
AL	1.591	1.572	1.934	1.737	1.861	1.541	1.415	1.837	1.763	1.452
FE2	0.023	0.023	0.017	0.031	0.022	0.035	0.029	0.022	0.035	0.040
CA	0.659	0.634	0.988	0.796	0.917	0.646	0.424	0.908	0.804	0.558
K	0.006	0.007	0.000	0.004	0.002	0.008	0.024	0.002	0.004	0.018
NA	0.341	0.373	0.035	0.208	0.084	0.362	0.473	0.110	0.176	0.466
END MEMBER COMPOSITIONS										
AB	33.89	36.76	3.46	20.69	8.39	35.63	51.37	10.77	17.90	44.70
AN	65.46	62.56	96.54	78.96	91.43	63.56	46.02	88.99	81.75	53.57
OR	0.64	0.69	0.00	0.35	0.18	0.81	2.61	0.23	0.36	1.73

DOMINICA VOLCANICS - LIST 1 - PLAGIOCLASES

	41	42	43	44	45	46	47	48	49
	F366B-PC	F366B-PR	F375B-PC	F375B-PR	F440-PC	F440-PR	F451-PC	F451-PR	F451-PG
OXIDE WEIGHT PERCENTAGE									
SIO2	44.66	51.84	44.60	51.77	46.01	49.95	44.79	47.93	51.75
AL2O3	34.09	29.27	34.54	29.53	34.20	31.26	34.38	32.25	29.01
FEO	0.39	0.61	0.36	0.74	0.36	0.71	0.43	0.84	1.09
CAO	18.82	13.25	19.33	13.59	18.45	15.27	19.34	16.33	13.41
K2O	0.01	0.14	TR.	0.16	TR.	0.07	0.02	0.22	0.19
NA2O	0.99	3.69	0.71	3.63	0.96	2.59	0.58	2.45	4.05
TOTAL	98.96	98.80	99.54	99.42	99.98	99.85	99.54	100.02	99.50
ATOMIC PROPORTIONS ON THE BASIS OF 8 OXYGENS									
SI	2.088	2.386	2.074	2.372	2.121	2.287	2.083	2.208	2.377
AL	1.879	1.588	1.894	1.595	1.859	1.688	1.885	1.752	1.571
FE2	0.015	0.023	0.014	0.028	0.014	0.027	0.017	0.032	0.042
CA	0.943	0.653	0.963	0.667	0.912	0.749	0.964	0.806	0.660
K	0.001	0.008	0.000	0.009	0.000	0.004	0.001	0.013	0.011
NA	0.090	0.329	0.064	0.323	0.086	0.230	0.052	0.219	0.361
END MEMBER COMPOSITIONS									
AB	8.69	33.24	6.23	32.29	8.61	23.39	5.14	21.09	34.96
AN	91.25	65.93	93.77	66.78	91.39	76.19	94.74	77.66	63.96
OR	0.06	0.83	0.00	0.94	0.00	0.42	0.12	1.25	1.08

DOMINICA VOLCANICS - LIST 2A - AMPHIBOLES (ALL FE AS FEO)

	1	2	3	4	5	6	7
	P4-A	P9-A	P11-A	L46-A	L47-A	F164-A	F165-A
OXIDE WEIGHT PERCENTAGE							
SIO2	46.65	47.05	46.34	43.41	46.01	45.23	46.86
TIO2	1.48	1.61	1.65	2.66	1.83	2.14	1.84
AL203	7.48	6.87	7.42	10.46	7.52	8.13	7.19
FEO	17.18	16.84	16.82	14.90	17.43	17.40	15.78
MNO	0.48	0.38	0.38	0.35	0.44	0.44	0.34
MGO	12.29	12.07	12.11	12.70	12.12	11.89	13.08
CAO	10.83	11.07	10.91	11.07	10.61	11.00	10.97
K2O	0.29	0.24	0.34	0.34	0.42	0.33	0.33
NA2O	1.29	1.26	1.56	2.24	1.44	1.92	1.40
TOTAL	97.97	97.39	97.53	98.13	97.82	98.48	97.79
ATOMIC PROPORTIONS ON THE BASIS OF 23 OXYGENS							
SI	6.926	7.012	6.913	6.430	6.865	6.729	6.929
TI	0.165	0.180	0.185	0.296	0.205	0.239	0.205
AL	1.309	1.207	1.305	1.827	1.323	1.426	1.254
FE2	2.133	2.099	2.099	1.846	2.175	2.165	1.952
MN	0.060	0.048	0.048	0.044	0.056	0.055	0.043
MG	2.719	2.681	2.692	2.803	2.695	2.636	2.883
CA	1.723	1.768	1.744	1.757	1.696	1.754	1.738
K	0.055	0.046	0.065	0.064	0.080	0.063	0.062
NA	0.372	0.364	0.451	0.644	0.417	0.554	0.402
END MEMBER COMPOSITIONS							
CA	25.97	26.80	26.49	27.24	25.62	26.53	26.28
MG	40.98	40.64	40.90	43.46	40.70	39.88	43.57
FE	33.06	32.55	32.61	29.30	33.69	33.59	30.15

DOMINICA VOLCANICS - LIST 2B - AMPHIBOLES (FE203/FEO=0.68)

	1	2	3	4	5	6	7
	P4-A	P9-A	P11-A	L46-A	L47-A	F164-A	F165-A
OXIDE WEIGHT PERCENTAGE							
SIO2	46.65	47.05	46.34	43.41	46.01	45.23	46.86
TIO2	1.48	1.61	1.65	2.66	1.83	2.14	1.84
AL203	7.48	6.87	7.42	10.46	7.52	8.13	7.19
FE203	7.28	7.14	7.13	6.66	7.39	7.37	6.68
FEO	10.62	10.41	10.40	8.90	10.77	10.76	9.76
MNO	0.48	0.38	0.38	0.35	0.44	0.44	0.34
MGO	12.29	12.07	12.11	12.70	12.12	11.89	13.08
CAO	10.83	11.07	10.91	11.07	10.61	11.00	10.97
K20	0.29	0.24	0.34	0.34	0.42	0.33	0.33
NA20	1.29	1.26	1.56	2.24	1.44	1.92	1.40
TOTAL	98.69	98.10	98.24	98.79	98.55	99.21	98.45
ATOMIC PROPORTIONS ON THE BASIS OF 23 OXYGENS							
SI	6.806	6.892	6.795	6.328	6.744	6.611	6.819
TI	0.162	0.177	0.182	0.292	0.202	0.235	0.201
AL	1.287	1.186	1.283	1.798	1.299	1.401	1.234
FE3	0.799	0.787	0.787	0.731	0.815	0.811	0.732
FE2	1.296	1.275	1.276	1.085	1.320	1.315	1.188
MN	0.059	0.047	0.047	0.043	0.055	0.054	0.042
MG	2.672	2.635	2.646	2.759	2.647	2.590	2.837
CA	1.693	1.738	1.714	1.729	1.667	1.723	1.711
K	0.054	0.045	0.064	0.063	0.079	0.062	0.061
NA	0.365	0.358	0.444	0.633	0.409	0.544	0.395

DOMINICA VOLCANICS - LIST 3 - CLINOPYROXENES

	1	2	3	4	5	6	7	8	9	10
	P4-L	P9-L	P11-L	L25-L	L46-L1	L46-L2	L47-L	L135-L1	L135-L2	F150-L
OXIDE WEIGHT PERCENTAGE										
SIO2	51.20	51.56	52.10	49.69	51.79	51.89	51.75	48.05	51.00	51.15
TIO2	N D	N D	N D	N D	N D	N D	N D	0.94	0.41	0.57
AL203	1.14	1.15	1.03	4.49	1.07	1.68	1.86	6.02	2.10	2.57
FEO	12.38	11.93	11.42	9.21	12.12	10.62	9.11	6.72	8.47	11.27
MNO	0.57	0.49	0.48	0.30	0.48	0.53	0.35	0.07	0.26	0.38
MGO	12.68	12.80	12.47	13.46	12.65	13.53	14.81	13.30	14.95	14.36
CAO	21.04	20.83	21.54	21.31	21.47	21.15	21.30	23.58	21.74	19.54
TOTAL	99.01	98.76	99.04	98.46	99.58	99.40	99.18	98.68	98.93	99.84
ATOMIC PROPORTIONS ON THE BASIS OF 6 OXYGENS										
SI	1.960	1.971	1.982	1.884	1.968	1.959	1.945	1.814	1.921	1.920
TI	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.027	0.012	0.016
AL	0.051	0.052	0.046	0.201	0.048	0.075	0.082	0.268	0.093	0.114
FE2	0.396	0.381	0.363	0.292	0.385	0.335	0.286	0.212	0.267	0.354
MN	0.018	0.016	0.015	0.010	0.015	0.017	0.011	0.002	0.008	0.012
MG	0.723	0.729	0.707	0.761	0.716	0.761	0.830	0.748	0.839	0.803
CA	0.863	0.853	0.878	0.866	0.874	0.856	0.858	0.954	0.878	0.786
END MEMBER COMPOSITIONS										
CA	43.13	43.10	44.71	44.91	43.90	43.45	43.22	49.77	44.06	40.20
MG	36.14	36.83	36.00	39.45	35.97	38.66	41.79	39.04	42.13	41.09
FE	20.73	20.07	19.29	15.65	20.12	17.89	14.99	11.19	13.81	18.71

DOMINICA VOLCANICS - LIST 3 - CLINOPYRCXENES

	11	12	13	14	15	16	17	18	19	20
	F164-L	F165-L1	F165-L2	F169-L	F173-L	F174-L	F174-LG	F181-L1	F181-L2	A188-L
OXIDE WEIGHT PERCENTAGE										
SIO2	51.72	51.90	49.80	51.40	50.75	51.37	52.67	50.19	50.22	51.08
TIO2	0.19	N D	0.57	0.46	0.65	0.47	0.44	0.75	0.65	0.73
AL203	1.02	2.74	2.16	1.75	2.82	1.62	2.19	3.66	3.47	1.97
FEO	11.20	10.69	11.71	11.19	10.91	11.27	10.30	8.92	8.73	10.67
MNO	0.42	0.36	0.39	0.40	0.39	0.42	0.43	0.25	0.18	0.37
MGO	13.59	13.87	14.45	14.95	14.15	14.68	15.72	14.64	14.64	14.94
CAO	21.92	20.41	19.96	19.29	19.86	19.86	19.10	20.60	21.21	19.88
TOTAL	100.06	99.97	99.04	99.44	99.53	99.69	100.85	99.01	99.10	99.64
ATOMIC PROPORTIONS ON THE BASIS OF 6 OXYGENS										
SI	1.951	1.940	1.899	1.936	1.911	1.935	1.941	1.887	1.888	1.920
TI	0.005	0.000	0.016	0.013	0.018	0.013	0.012	0.021	0.018	0.021
AL	0.045	0.121	0.097	0.078	0.125	0.072	0.095	0.162	0.154	0.087
FE2	0.353	0.334	0.373	0.353	0.344	0.355	0.318	0.281	0.275	0.336
MN	0.013	0.011	0.013	0.013	0.012	0.013	0.013	0.008	0.006	0.012
MG	0.764	0.773	0.821	0.839	0.794	0.824	0.863	0.820	0.820	0.837
CA	0.886	0.818	0.816	0.779	0.801	0.802	0.754	0.830	0.855	0.801
END MEMBER COMPOSITIONS										
CA	43.93	42.23	40.32	39.26	41.07	40.20	38.71	42.81	43.71	40.34
MG	37.88	39.91	40.59	42.32	40.69	41.32	44.31	42.31	41.96	42.16
FE	18.19	17.85	19.09	18.42	18.24	18.48	16.98	14.88	14.33	17.49

DOMINICA VOLCANICS - LIST 3 - CLINOPYROXENES

	21	22	23	24	25	26	27
	T278-L1	T278-L2	T278-LG	F366B-L	F375B-L	F440-L	F451-LG
OXIDE WEIGHT PERCENTAGE							
SIO2	48.16	47.96	51.95	50.64	50.78	48.53	49.57
TIO2	N D	1.15	0.30	0.67	0.57	0.89	0.89
AL203	5.41	5.30	1.11	2.44	2.82	5.14	1.94
FEO	10.64	10.39	20.45	9.66	10.91	9.27	16.66
MNO	0.29	0.26	0.68	0.32	0.34	0.22	0.55
MGO	13.00	13.26	20.00	14.87	14.59	13.49	12.77
CAO	20.92	20.72	4.37	20.22	19.83	21.15	15.31
TOTAL	98.42	99.04	98.86	98.82	99.84	98.69	97.69
ATOMIC PROPORTIONS ON THE BASIS OF 6 OXYGENS							
SI	1.842	1.822	1.966	1.913	1.906	1.840	1.934
TI	0.000	0.033	0.009	0.019	0.016	0.025	0.026
AL	0.244	0.237	0.050	0.109	0.125	0.230	0.089
FE2	0.340	0.330	0.647	0.305	0.343	0.294	0.544
MN	0.009	0.008	0.022	0.010	0.011	0.007	0.018
MG	0.741	0.751	1.128	0.837	0.816	0.762	0.743
CA	0.858	0.844	0.177	0.819	0.798	0.859	0.640
END MEMBER COMPOSITIONS							
CA	44.01	43.64	8.98	41.53	40.55	44.70	32.92
MG	38.03	38.84	57.13	42.47	41.49	39.65	38.19
FE	17.95	17.51	33.89	16.00	17.96	15.66	28.89

DOMINICA VOLCANICS - LIST 4 - ORTHOPYROXENES

	1	2	3	4	5	6	7	8	9	10
	P4-R	P9-R	P11-R	P11-RG	L25-R	L25-RG	L46-R	L47-R	L135-R	F150-R
OXIDE WEIGHT PERCENTAGE										
SIO2	51.29	51.52	51.70	52.01	51.42	53.74	53.28	51.05	51.05	51.57
AL2O3	0.55	0.54	0.46	1.06	0.53	1.86	1.10	0.72	0.50	1.15
FEO	28.64	28.45	28.04	27.22	28.23	18.01	18.33	28.34	27.79	20.17
MNO	1.32	1.15	1.16	1.12	0.92	0.66	0.61	1.26	1.28	0.66
MGO	17.51	17.79	17.42	18.06	17.42	24.84	24.18	17.01	17.51	23.47
CAO	0.89	1.05	1.08	1.20	0.92	1.32	1.77	1.08	1.07	1.60
TOTAL	100.20	100.50	99.86	100.67	99.44	100.43	99.27	99.46	99.20	98.62
ATOMIC PROPORTIONS ON THE BASIS OF 6 OXYGENS										
SI	1.976	1.976	1.991	1.977	1.988	1.956	1.969	1.980	1.981	1.942
AL	0.025	0.024	0.021	0.048	0.024	0.080	0.048	0.033	0.023	0.051
FE2	0.923	0.913	0.903	0.865	0.913	0.548	0.567	0.919	0.902	0.635
MN	0.043	0.037	0.038	0.036	0.030	0.020	0.019	0.041	0.042	0.021
MG	1.006	1.017	1.000	1.023	1.004	1.347	1.332	0.983	1.013	1.317
CA	0.037	0.043	0.045	0.049	0.038	0.051	0.070	0.045	0.045	0.065
END MEMBER COMPOSITIONS										
CA	1.83	2.15	2.24	2.48	1.92	2.62	3.53	2.26	2.22	3.17
MG	50.07	50.59	50.36	51.84	50.57	68.48	67.01	49.44	50.60	64.63
FE	48.10	47.26	47.40	45.68	47.51	28.90	29.47	48.31	47.17	32.20

DOMINICA VOLCANICS - LIST 4 - ORTHOPYROXENES

	11	12	13	14	15	16	17	18	19	20
	F164-R	F165-R1	F165-R2	F169-R	F173-R	F174-R	T278-R1	T278-R2	F366B-R	F375B-R
OXIDE WEIGHT PERCENTAGE										
SIO2	51.84	52.24	51.29	52.43	52.68	53.06	53.37	52.85	52.85	52.93
AL2O3	0.55	0.70	0.66	1.63	1.04	0.80	1.14	1.41	1.66	1.69
FEO	25.93	25.56	25.95	19.25	20.08	19.70	19.32	19.59	18.54	19.35
MNO	1.02	0.89	0.86	0.54	0.61	0.60	0.53	0.53	0.52	0.61
MGO	19.76	19.27	19.64	23.98	23.63	23.22	22.93	23.30	24.33	23.69
CAO	0.97	1.06	1.11	1.68	1.77	1.82	2.10	2.15	1.93	1.93
TOTAL	100.07	99.72	99.51	99.51	99.81	99.20	99.39	99.83	99.83	100.20
ATOMIC PROPORTIONS ON THE BASIS OF 6 OXYGENS										
SI	1.972	1.987	1.964	1.943	1.955	1.976	1.979	1.956	1.946	1.949
AL	0.025	0.031	0.030	0.071	0.046	0.035	0.050	0.062	0.072	0.073
FE2	0.825	0.813	0.831	0.597	0.623	0.614	0.599	0.606	0.571	0.596
MN	0.033	0.029	0.028	0.017	0.019	0.019	0.017	0.017	0.016	0.019
MG	1.120	1.092	1.121	1.325	1.307	1.289	1.267	1.285	1.335	1.300
CA	0.040	0.043	0.046	0.067	0.070	0.073	0.083	0.085	0.076	0.076
END MEMBER COMPOSITIONS										
CA	1.96	2.19	2.25	3.33	3.49	3.64	4.24	4.28	3.81	3.82
MG	55.52	55.24	55.34	66.06	64.71	64.63	64.44	64.47	66.81	65.29
FE	42.52	42.57	42.41	30.61	31.81	31.72	31.32	31.25	29.38	30.89

DOMINICA VOLCANICS - LIST 4 - ORTHOPYROXENES

21

F440-R

OXIDE WEIGHT PERCENTAGE

SIO2	52.01
AL203	3.24
FEO	17.49
MNO	0.43
MGO	24.69
CAO	1.72
TOTAL	99.58

ATOMIC PROPORTIONS ON THE BASIS OF 6 OXYGENS

SI	1.909
AL	0.140
FE2	0.537
MN	0.013
MG	1.351
CA	0.068

END MEMBER COMPOSITIONS

CA	3.44
MG	68.61
FE	27.96

DOMINICA VOLCANICS - LIST 5 - OLIVINES

	1	2	3	4	5	6	7	8	9	10
	L46-OL	L135-OL	F150-OL	F169-OL	F173-OL	F174-OL	F181-OL	A188-OL	A188-OG	T278-CL
OXIDE WEIGHT PERCENTAGE										
SIO2	36.99	38.91	37.10	36.89	36.92	35.56	38.93	38.80	34.58	37.84
FEO	27.93	21.50	29.54	27.64	29.34	34.51	16.26	18.39	42.15	24.76
MNO	0.63	0.25	0.62	0.55	0.60	0.72	0.20	0.24	0.98	0.46
MGO	34.15	39.66	32.74	34.53	32.93	28.40	43.14	42.06	22.84	37.02
TOTAL	99.70	100.32	100.00	99.61	99.79	99.19	98.53	99.49	100.55	100.08
ATOMIC PROPORTIONS ON THE BASIS OF 4 OXYGENS										
SI	0.994	1.003	1.001	0.991	0.998	0.995	0.998	0.995	0.993	0.996
FE2	0.628	0.464	0.667	0.621	0.663	0.808	0.349	0.395	1.012	0.545
MN	0.014	0.005	0.014	0.013	0.014	0.017	0.004	0.005	0.024	0.010
MG	1.368	1.524	1.316	1.383	1.326	1.184	1.649	1.608	0.977	1.452
END MEMBER COMPOSITIONS										
MG	68.05	76.46	65.91	68.57	66.21	58.95	82.36	80.09	48.54	72.34
FE	31.95	23.54	34.09	31.43	33.79	41.05	17.64	19.91	51.46	27.66

DOMINICA VOLCANICS - LIST 5 -- OLIVINES

	11	12	13	14	15
	F366B-OL	F375B-CL	F440-OL	F451-OL	F451-OG
OXIDE WEIGHT PERCENTAGE					
SIO2	36.52	35.05	37.36	37.81	35.05
FEO	29.93	38.33	29.16	25.92	38.41
MNO	0.66	0.80	0.57	0.47	0.80
MGO	32.94	25.73	33.38	36.19	24.40
TOTAL	100.05	99.91	100.47	100.39	98.66
ATOMIC PROPORTIONS ON THE BASIS OF 4 OXYGENS					
SI	0.989	0.993	1.000	0.997	1.006
FE2	0.678	0.908	0.653	0.572	0.922
MN	0.015	0.019	0.013	0.011	0.019
MG	1.329	1.086	1.332	1.422	1.044
END MEMBER COMPOSITIONS					
MG	65.73	53.95	66.67	70.95	52.57
FE	34.27	46.05	33.33	29.05	47.43

DOMINICA VOLCANICS - LIST 6A - MAGNETITES

	1	2	3	4	5	6
	P11-MG	L25-MG	L46-M	F165-MG	F181-M	A188-MG
OXIDE WEIGHT PERCENTAGE						
TIO2	11.11	8.06	10.39	12.03	9.40	20.52
AL203	1.77	0.49	4.66	1.72	6.48	1.99
FEO	80.64	82.36	75.92	80.72	73.13	71.58
MGO	0.80	0.99	3.46	0.98	4.56	1.22
TOTAL	94.32	91.90	94.43	95.45	93.57	95.31
CORRECTED ANALYSES (AFTER CARMICHAEL, 1967)						
ILMENITE BASIS						
FE203	52.47	56.70	51.46	52.18	50.55	39.93
FEO	33.42	31.34	29.61	33.76	27.64	35.65
TOTAL	99.57	97.58	99.58	100.67	98.63	99.31
ULVOSPINEL BASIS						
FE203	45.07	51.33	44.54	44.17	44.29	26.26
FEO	40.08	36.17	35.84	40.97	33.27	47.95
TOTAL	98.83	97.04	98.89	99.87	98.00	97.94
% USP	31.70	23.62	28.60	33.91	25.66	58.27

MAGNETITES - LIST 6B - FE203:FEO DISTRIBUTION,AFTER CARMICHAEL(1967)

	1	2	3	4	5	6
	P11-MG	L25-MG	L46-M	F165-MG	F181-M	A188-MG
OXIDE WEIGHT PERCENTAGE						
TIO2	11.11	8.06	10.39	12.03	9.40	20.52
AL203	1.77	0.49	4.66	1.72	6.48	1.99
FE203	45.07	51.33	44.54	44.17	44.29	26.26
FEO	40.08	36.17	35.84	40.97	33.27	47.95
MGO	0.80	0.99	3.46	0.98	4.56	1.22
TOTAL	98.83	97.04	98.89	99.87	98.00	97.94
ATOMIC PROPORTIONS ON THE BASIS OF 32 OXYGENS						
TI	2.536	1.889	2.288	2.713	2.052	4.661
AL	0.633	0.180	1.609	0.608	2.218	0.709
FE3	10.293	12.039	9.814	9.965	9.676	5.968
FE2	10.173	9.428	8.776	10.273	8.078	12.111
MG	0.362	0.460	1.510	0.438	1.973	0.549

APPENDIX 2:1

LIST OF LESSER ANTILLES PLUTONIC NODULES SPECIMENS

The following explanations refer to the column headings:

SPEC NO

The diverse origins of the specimens have led to a somewhat complicated identifier scheme. The numbers are divided into two parts, initial letters which represent the island of origin and subsequent numbers which refer to the collections from which specimens have been obtained.

The islands are listed from north to south with abbreviations that are used throughout the thesis, given below:

SA	=	Saba	
SE	=	St. Eustatius	
K	=	St. Kitts	
N	=	Nevis	
F	=	Montserrat	
G	=	Guadeloupe	
D	=	Dominica	
M	=	Martinique	
L	=	St. Lucia	
V	=	St. Vincent	
BQ	=	Bequia)	Grenadines
WCA	=	Carriacou)	
X	=	Grenada	

The numbers of the specimens obtained from the U.W.I. and Oxford University are as found in their official specimen-collection catalogues. If a name is given under the source column then the numbers refer to that person's original field numbers as described in their thesis. Two of the U.W.I. specimens did not have numbers and have been called LUIUWI and WCAUWI. In this column the symbol + means and, and the symbol - means inclusive to.

OCCURRENCE

All the information known to the writer is given. In many cases a number of nodules were obtained as loose blocks from a small area such as a river bed or from an unconsolidated deposit. In these cases a sentence describing their occurrence is given.

LOCALITY

As with the volcanic specimens these are general areas rather than exact locations, and are useful in discussion.

SOURCE

During this research, the presence of various small collections of plutonic nodules became known to the writer. In May 1972, after the second field season, Dr J.F. Tomblin and Dr H. Sigurdsson kindly gave permission for the writer to take pieces off the specimens in the University of the West Indies collections. These specimens have proved most useful in filling the gaps where a British research student has not studied an area, for example Saba, St Eustatius, Nevis, Martinique and the Grenadines.

The other specimens were obtained from collections at Oxford and Durham Universities. At Oxford, Professor E.A. Vincent kindly gave permission for pieces to be cut from the collections made by the late Professor L.R. Wager from St. Vincent, Dr P.E. Baker from St. Kitts, Dr J.F. Tomblin from St. Lucia and most recently by Dr W.J. Rea from Montserrat. The latter three workers also kindly indicated that they would not object to the writer studying the specimens that they collected.

At Durham, the writer's own Dominica collection contained over 40 plutonic nodules, whilst Dr R.J. Arculus kindly left about 27 nodules from Grenada in the writer's possession. The writer would like to express his sincere thanks to all the geologists, named above, since without their initial field collections the comprehensive nature of the specimen collection would not have been possible. In fact the only major island which is not represented in the specimen collection is Guadeloupe. This is unfortunate, as the writer and Dr H. Sigurdsson spent 1 week of intensive field collecting there in April 1973. A special lookout was kept for plutonic nodules but none were found.

GRID REFERENCE

The system used at the Seismic Unit U.W.I. Trinidad, has been used as described in appendix 1:1 p 4. Many of these grid references indicate areas rather than exact locations, but this is not considered worrying because of their xenolithic origin.

APENDIX 2.1 - LIST OF LESSER ANTILLES PLUTONIC NODULES SPECIMENS

SPEC NO	OCCURRENCE	LOCALITY	SOURCE	GRID REFERENCE
SABA				
SA6X	CONGLOMERATE	LADDER BAY	UWI COLL	17381N 63149W
ST EUSTATIUS				
SE31A	CONGLOMERATE	PILOT HILL	UWI COLL	17301N 62597W
SE31B	CONGLOMERATE	PILOT HILL	UWI COLL	17301N 62597W
SE48A	LOOSE BLOCK	WHITE WALL GUT	UWI COLL	17283N 62576W
SE48B	LOOSE BLOCK	WHITE WALL GUT	UWI COLL	17283N 62576W
ST KITTS				
K531+532	THE ST KITTS PLUTONIC NODULES NORMALLY		OXFORD COLL	MT MISERY
K535	OCCUR AS LOOSE BLOCKS IN THE RIVER		OXFORD COLL	17225N 62487W
K540	VALLEYS SURROUNDING MT MISERY		OXFORD COLL	
K570	A FEW ARE IN SITU INTERBEDED WITH		OXFORD COLL	
K572	PYROCLAST FALL DEPOSITS		OXFORD COLL	
K576	(REF BAKER 1963 P140)		OXFORD COLL	
K599	AS ABOVE		OXFORD COLL	
K642	AS ABOVE		OXFORD COLL	
K646	AS ABOVE		OXFORD COLL	
K674	AS ABOVE		OXFORD COLL	
K678	AS ABOVE		OXFORD COLL	
K699-701	AS ABOVE		OXFORD COLL	
K716	AS ABOVE		OXFORD COLL	
K719	AS ABOVE		OXFORD COLL	
K736	AS ABOVE		OXFORD COLL	
K740+741	AS ABOVE		OXFORD COLL	
K745	AS ABOVE		OXFORD COLL	
K747	AS ABOVE		OXFORD COLL	
K754	AS ABOVE		OXFORD COLL	
K785	AS ABOVE		OXFORD COLL	
K70-73	AS ABOVE		UWI COLL	
NEVIS				
N68	LAVA FLOW	CADES POINT	UWI COLL	17114N 62371W
N82	ANDESITE BLOCK	NEW RIVER GUT	UWI COLL	17089N 62335W
L 3	AS ABOVE			

SPEC NO	OCCURRENCE	LOCALITY	SOURCE	GRID REFERENCE
MONTSERRAT				
F472	AIR FALL SERIES	WHITE RIVER GHAUT	J.REA COLL	16413N 62113W
F592+593	AIR FALL SERIES	WHITE RIVER GHAUT	J.REA COLL	16413N 62113W
	(REF REA 1970 P103)			
DOMINICA				
D170	LOOSE BLOCK	SAVANE RIVER	K.WILLS COLL	15185N 61155W
D172	LOOSE BLOCK	SAVANE RIVER	K.WILLS COLL	15185N 61154W
D211-214	XENOLITHS IN LAVA FLOW	GALBA ROADCUT	K.WILLS COLL	15189N 61151W
D218	XENOLITH IN ANDESITE	PETIT COULIBRI	K.WILLS COLL	15229N 61125W
D249+250	LAVA FLOW	GALBA ROADCUT	K.WILLS COLL	15189N 61151W
D366-376	LOOSE BLOCKS	SAVANE RIVER	K.WILLS COLL	15183N 61153W
D407-425	LOOSE BLOCKS	SAVANE RIVER	K.WILLS COLL	15185N 61153W
MARTINIQUE				
M3	PYROCLAST FLOW XEN	RIVER SECHE MOUTH	OXFORD COLL	14458N 61117W
M29	PYROCLAST FLOW XEN	N OF ST PIERRE	UWI COLL	1445 N 6111 W
M129	PYROCLAST FLOW XEN	RIVER SECHE MOUTH	OXFORD COLL	14458N 61117W
M131	PYROCLAST FLOW XEN	RIVER SECHE MOUTH	UWI COLL	14458N 61117W
M218	PYROCLAST FLOW XEN	ANSE MARIGOT	UWI COLL	14408N 61103W
ST LUCIA				
L388	THE ST LUCIAN PLUTONIC NODULES OCCUR AS		OXFORD COLL	
L418	XENOLITHS IN ANESITE AND DACITE LAVAS		OXFORD COLL	
L441	FROM THE SOUFRIERE REGION		OXFORD COLL	1350 N 6103 W
L461	(REF TOMBLIN 1964 P134)		OXFORD COLL	
L494	AS ABOVE		OXFORD COLL	
L595	AS ABOVE		OXFORD COLL	
L597	AS ABOVE		OXFORD COLL	
L599	AS ABOVE		OXFORD COLL	
L607	AS ABOVE		OXFORD COLL	
L613	AS ABOVE		OXFORD COLL	
L627+628	AS ABOVE		OXFORD COLL	
L631	AS ABOVE		OXFORD COLL	
L642	AS ABOVE		OXFORD COLL	
L666	AS ABOVE		OXFORD COLL	
L696	AS ABOVE		OXFORD COLL	
L703	AS ABOVE		OXFORD COLL	

SPEC NO	OCCURRENCE	LOCALITY	SOURCE	GRID REFERENCE
ST LUCIA CONTINUED				
L722	AS ABOVE		OXFORD COLL	
L757	AS ABOVE		OXFORD COLL	
L763	AS ABOVE		OXFORD COLL	
L770	AS ABOVE		OXFORD COLL	
L782	AS ABOVE		OXFORD COLL	
L791	AS ABOVE		OXFORD COLL	
L794	AS ABOVE		OXFORD COLL	
L825+826	AS ABOVE		OXFORD COLL	
L828	AS ABOVE		OXFORD COLL	
L831	AS ABOVE		OXFORD COLL	
L861	AS ABOVE		OXFORD COLL	
LU1UWI	AS ABOVE		UWI COLL	
ST VINCENT				
V369-374	THE ST VINCENT MATERIAL OCCURS AS ABUNDANT		UWI COLL	
V377	LOOSE BLOCKS IN THE 1902 ERUPTION REMAINS		UWI COLL	
V381	MAINLY IN THE RABAKA RIVER VALLEY		UWI COLL	13180N 61075W
V471	AND THE WALLIBOU RIVER VALLEY		UWI COLL	13170N 61145W
V472	(REF LEWIS 1964 P7)	AS ABOVE	UWI COLL	
V717A	LOOSE RIVER BLOCK	AS ABOVE	OXFORD COLL	
V731A	LOOSE RIVER BLOCK	AS ABOVE	OXFORD COLL	
V773	LOOSE RIVER BLOCK	AS ABOVE	OXFORD COLL	
GRENADINES				
BQ14	LAVA FLOW	PARK ESTATE	UWI COLL	13016N 61128W
WCAUWI	NOT KNOWN		UWI COLL	
WCA48	BLOCK IN AGGLOMERATE	SW OF BRUNSWICK	UWI COLL	12283N 61281W
WCA69	WATERLAID TUFF	KINDACE PT	UWI COLL	12276N 61259W
WCA289	NOT KNOWN		UWI COLL	
GRENADA				
X136	BLOCK IN TUFF	TRUE BLUE ESTATE	UWI COLL	12004N 61463W
X245-257	BLOCKS IN AGGLOMERATE	DOTHAN	UWI COLL	12082N 61447W
X316	BLOCK IN AGGLOMERATE	BAY W OF GALBY	UWI COLL	12024N 61387W
X394-409	BLOCKS IN AGGLOMERATE	DOTHAN	UWI COLL	12082N 61447W
X418	BLOCK IN SCORIA	GRENVILLE	UWI COLL	12073N 61374W
X514+515	BLOCKS IN REWORKED	PRICKLY POINT	R.ARCULUS COLL	11593N 61455W
X518-524	BLOCKS IN REWORKED	PRICKLY POINT	R.ARCULUS COLL	11593N 61455W
X534	BLOCK IN REWORKED	PRICKLY POINT	R.ARCULUS COLL	11593N 61455W
	(REF ARCULUS 1973 P47)			

APPENDIX 2:2

PLUTONIC MODES

Modal analyses were carried out in the same way as previously described for the volcanic specimens in Appendix 1:2. As before, these modes are considered more useful than visual estimates, though as most of the specimens are cumulates some variation is expected due to crystal sorting. In addition these specimens are coarse grained so that even in a homogeneous hand specimen, the mode based on one thin section may be misleading. Despite these drawbacks, these modes have been found useful, particularly when small volumes are present, or when applied to a group of specimens. The following abbreviations are explained:

PLAG	=	plagioclose
AMPH	=	amphibole
ORPX	=	orthopyroxene
CLPX	=	clinopyroxene
OLIV	=	olivine
MAGN	=	magnetite
QUTZ	=	quartz
BIOT	=	biotite
SCOR	=	scoria (interstitial glass)

LESSER ANTILLES PLUTONICS - APENDIX 2.2 - MODES

	SA6X	SE31A	SE31B	SE48A	SE48B	K72	K532	K535	K576	K642
PERCENT										
PLAG	52.60	79.60	65.60	28.90	37.00	44.30	50.90	59.90	60.00	63.90
AMPH	35.70	10.80	10.40	45.40	45.30	40.20	2.70	6.00	31.80	4.30
ORPX	1.00	2.40	0.00	0.00	0.00	0.00	5.40	21.30	1.40	14.70
CLPX	0.00	0.00	3.20	1.50	0.00	3.20	28.40	7.90	0.00	11.30
OLIV	0.00	0.00	19.40	0.00	0.00	0.80	7.10	0.00	0.00	0.00
MAGN	1.70	7.30	1.40	6.30	0.00	6.20	4.50	4.90	3.90	5.80
QUTZ	7.90	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
BIOT	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
SCOR	0.00	0.00	0.00	0.00	17.70	4.60	0.00	0.00	2.90	0.00

LESSER ANTILLES PLUTONICS - APENDIX 2.2 - MODES

	K674	K678	K699	K700	K701	K740	K745	F472	F592	F593
PERCENT										
PLAG	40.20	67.10	72.60	73.40	56.40	46.80	70.60	48.80	45.50	56.30
AMPH	37.10	0.00	8.30	9.40	33.90	46.40	0.00	48.80	48.00	28.40
ORPX	0.00	14.20	7.60	6.90	1.00	0.00	0.00	0.00	0.00	0.00
CLPX	0.00	0.50	3.20	7.30	0.00	0.00	0.00	0.00	0.00	0.00
OLIV	0.00	0.00	0.20	0.80	0.60	6.20	17.60	0.00	0.00	7.10
MAGN	18.30	1.80	2.40	1.80	6.70	0.00	0.00	2.40	1.30	1.00
QUTZ	0.00	15.50	4.60	0.40	0.00	0.00	0.00	0.00	0.00	0.00
BIOT	0.00	0.90	1.10	0.10	0.00	0.00	0.00	0.00	0.00	0.00
SCOR	4.40	0.00	0.00	0.00	1.40	0.60	11.80	0.00	5.20	7.10

LESSER ANTILLES PLUTONICS - APENDIX 2.2 - MODES

	D170	D214	D218	D250A	D250C	D366A	D375A	D408	D409	D410
PERCENT										
PLAG	65.00	16.90	72.30	84.00	59.30	79.10	74.70	66.60	61.90	60.20
AMPH	0.00	72.50	11.10	0.00	0.00	0.00	0.00	0.00	0.60	18.50
ORPX	0.00	0.00	10.70	0.00	0.00	0.00	0.00	2.70	0.00	7.20
CLPX	16.30	7.20	3.20	0.70	28.30	0.80	3.40	15.60	22.30	8.60
OLIV	13.00	3.40	0.00	15.30	7.90	18.50	19.50	9.20	8.50	0.30
MAGN	5.70	0.00	2.20	0.00	4.50	1.60	2.40	5.90	6.70	5.20
QUTZ	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
BIOT	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
SCOR	0.00	0.00	0.50	0.00	0.00	0.00	0.00	0.00	0.00	0.00

LESSER ANTILLES PLUTONICS - APENDIX 2.2 - MODES

	D418	D423	M29	M131	L461	L628A	L628C	L703	L722	L782
PERCENT										
PLAG	63.90	47.00	48.00	40.20	56.30	49.40	18.00	47.00	53.00	65.10
AMPH	2.70	0.00	2.60	13.80	18.20	36.30	57.90	31.80	12.30	26.60
ORPX	2.60	0.00	27.70	12.60	6.70	0.00	21.60	0.00	11.00	3.10
CLPX	15.90	25.00	17.20	2.70	0.00	10.90	1.60	0.00	0.00	3.90
OLIV	8.00	17.10	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.80
MAGN	6.90	10.90	5.50	6.80	0.30	3.40	0.40	0.30	1.30	0.20
QUTZ	0.00	0.00	0.00	8.40	0.00	0.00	0.00	16.70	10.30	0.30
BIOT	0.00	0.00	0.00	0.00	0.00	0.00	0.00	4.20	12.10	0.00
SCOR	0.00	0.00	0.00	15.50	18.50	0.00	0.50	0.00	0.00	0.00

LESSER ANTILLES PLUTONICS - APENDIX 2.2 - MODES

	L861	LUWI	V370	BQ14	WCAU1	WCA48	WCA289	X245	X254	X255
PERCENT										
PLAG	8.60	46.80	37.40	19.00	31.10	32.90	69.00	0.00	21.60	0.30
AMPH	0.00	45.40	0.90	71.40	44.20	51.90	6.10	25.00	52.70	32.30
ORPX	0.80	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
CLPX	73.00	4.60	29.30	7.40	12.30	11.10	17.60	20.00	21.00	61.30
OLIV	7.40	0.00	1.40	1.50	0.10	0.00	0.00	50.00	2.60	0.60
MAGN	6.20	3.20	14.90	0.70	12.30	4.10	7.30	5.00	2.10	0.30
QUTZ	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
BIOT	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
SCOR	0.00	0.00	16.10	0.00	0.00	0.00	0.00	0.00	0.00	5.20

LESSER ANTILLES PLUTONICS - APENDIX 2.2 - MODES

	X403	X407	X408	X418
PERCENT				
PLAG	56.60	10.40	8.60	0.00
AMPH	36.00	29.50	78.20	0.00
ORPX	0.00	0.00	0.00	13.50
CLPX	5.30	59.60	8.70	8.40
OLIV	0.00	0.00	4.00	78.10
MAGN	2.10	0.50	0.50	0.00
QUTZ	0.00	0.00	0.00	0.00
BIOT	0.00	0.00	0.00	0.00
SCOR	0.00	0.00	0.00	0.00

APPENDIX 2:3

PLUTONICS X.R.F. MAJOR AND TRACE ELEMENT ANALYSES WITH C.I.P.W. NORMS

Details relevant to this appendix have been described earlier in appendix 1:3 p 22. As with the modes, it should be remembered that these are cumulates not magmas.

LESSER ANTILLES PLUTONICS - APENDIX 2.3 - MAJORS,TRACES AND CIPW NORMS

	SE31B	SE48A	SE48B	K72	K532	K535	K642	K674	K678	K700
PERCENT										
SIO2	43.15	41.05	42.17	42.32	45.78	46.51	45.90	39.90	59.83	49.11
AL2O3	22.25	18.73	19.07	19.20	19.60	18.61	20.75	19.07	18.19	22.69
FE2O3	10.57	12.71	9.61	12.86	12.07	11.56	11.30	14.59	6.98	9.07
MGO	7.92	9.68	10.71	8.72	6.80	6.32	5.46	9.40	2.31	4.02
CAO	15.46	14.30	15.54	14.72	13.46	14.19	14.13	14.34	7.22	11.32
NA2O	0.01	1.26	0.92	0.25	0.78	1.23	0.89	0.38	4.01	2.24
K2O	0.06	0.16	0.21	0.10	0.09	0.06	0.12	0.14	0.44	0.33
TIO2	0.35	1.90	1.58	1.59	1.05	1.21	1.15	1.97	0.70	0.92
MNO	0.15	0.13	0.10	0.16	0.25	0.22	0.21	0.13	0.16	0.17
P2O5	0.09	0.08	0.09	0.09	0.11	0.09	0.09	0.08	0.17	0.13
PPM										
BA	32	37	22	22	34	31	21	28	135	80
NB	1	1	1	1	3	1	1	1	2	1
ZR	5	20	16	13	21	20	18	8	73	48
Y	6	12	13	15	10	13	10	12	21	18
SR	245	283	348	249	273	286	315	215	299	298
RB	1	2	1	1	1	2	1	2	10	6
ZN	61	33	20	32	66	60	63	37	57	78
CU	6	173	8	136	3	21	10	187	4	5
NI	26	11	21	4	6	1	1	11	4	8
CIPW NORM										
QTZ	1.00	0.00	0.00	0.00	1.40	0.00	1.40	0.00	14.70	3.20
ORTH	0.40	0.90	1.20	0.60	0.50	0.40	0.70	0.80	2.60	2.00
ALB	0.10	6.80	3.10	2.10	6.70	10.50	7.60	3.20	34.10	19.10
ANOR	60.70	45.10	47.50	51.40	50.10	45.50	52.70	50.40	30.50	51.20
NEPH	0.00	2.10	2.60	0.00	0.00	0.00	0.00	0.00	0.00	0.00
DIOP	12.30	19.90	23.00	17.50	13.40	20.50	14.20	16.70	3.60	3.60
HYP	15.20	0.00	0.00	10.60	20.20	15.80	16.60	0.60	9.90	14.40
OLIV	0.00	10.50	12.30	8.70	0.00	1.50	0.00	16.30	0.00	0.00
MAG	9.40	6.00	7.10	5.80	5.40	3.30	4.30	8.00	2.80	4.60
ILM	0.70	3.60	3.00	3.00	2.00	2.30	2.20	3.80	1.30	1.80
APAT	0.20	0.20	0.20	0.20	0.30	0.20	0.20	0.20	0.40	0.30

LESSER ANTILLES PLUTONICS - APENDIX 2.3 - MAJORS,TRACES AND CIPW NORMS

	K701	K745	F592	D170	D172	D218	D250A	D250B	D250C	D408
PERCENT										
SIO2	41.30	42.29	39.14	45.76	41.74	51.71	43.06	43.52	42.66	44.41
AL2O3	20.90	23.07	17.62	23.68	20.68	20.88	23.58	21.76	19.87	21.31
FE2O3	13.19	8.72	16.69	9.49	11.89	9.57	9.67	10.17	11.39	11.03
MGO	8.19	11.09	10.31	5.49	7.03	3.40	6.91	6.03	8.16	6.20
CAO	14.10	14.44	13.39	14.03	17.43	10.40	16.30	17.54	16.93	15.63
NA2O	0.41	0.02	0.48	0.55	0.01	2.61	0.01	0.01	0.01	0.21
K2O	0.06	0.05	0.16	0.11	0.03	0.41	0.04	0.04	0.03	0.03
TIO2	1.58	0.13	1.96	0.61	0.99	0.57	0.21	0.71	0.73	0.88
MNO	0.19	0.12	0.16	0.18	0.13	0.23	0.14	0.14	0.15	0.21
P2O5	0.08	0.08	0.08	0.10	0.08	0.23	0.10	0.09	0.07	0.09
PPM										
BA	10	1	32	40	9	100	12	25	11	11
NB	1	1	1	2	1	4	2	1	1	1
ZR	11	7	20	22	5	46	11	8	6	11
Y	13	2	14	10	2	18	5	4	5	8
SR	270	254	264	316	256	351	336	285	258	340
RB	1	1	1	1	1	10	1	1	1	1
ZN	43	25	75	64	50	75	54	53	65	61
CU	7	7	84	17	20	65	39	57	65	20
NI	7	41	6	21	13	4	20	13	16	13
CIPW NORM										
QTZ	0.00	0.00	0.00	1.90	0.00	6.00	0.00	0.00	0.00	0.20
ORTH	0.40	0.30	1.00	0.70	0.20	2.40	0.20	0.20	0.20	0.20
ALB	3.50	0.20	4.10	4.70	0.10	22.20	0.10	0.10	0.10	1.80
ANOR	55.60	63.20	45.90	61.80	56.30	44.30	64.20	59.20	54.60	57.60
NEPH	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
DIOP	11.90	6.80	16.50	5.80	24.10	5.00	13.00	22.10	24.10	16.30
HYP	3.80	4.60	0.40	19.20	0.60	14.00	9.90	9.00	3.90	17.90
OLIV	18.10	22.90	18.00	0.00	10.90	0.00	7.30	2.90	11.40	0.00
MAG	3.50	1.70	10.20	4.60	5.80	4.30	4.70	5.00	4.10	4.10
ILM	3.00	0.20	3.80	1.20	1.90	1.10	0.40	1.30	1.40	1.70
APAT	0.20	0.20	0.20	0.20	0.20	0.50	0.20	0.20	0.20	0.20

LESSER ANTILLES PLUTONICS - APENDIX 2.3 - MAJORS, TRACES AND CIPW NORMS

	D409	D410	D411	D418	D423	M29	M131	LU1UW1	L461	L628A
PERCENT										
SIO2	41.89	44.60	46.90	40.80	42.81	48.62	54.82	43.20	56.59	44.25
AL203	23.24	21.20	22.98	21.97	20.58	14.24	14.31	19.78	17.40	19.85
FE203	11.89	11.35	9.17	13.46	11.97	11.35	12.20	10.52	6.70	10.48
MGO	6.17	6.54	5.24	9.14	7.15	10.68	6.94	7.18	5.97	7.53
CAO	15.76	14.37	13.63	13.23	16.23	13.06	7.28	16.35	9.40	16.07
NA2O	0.01	0.41	1.06	0.01	0.01	1.10	2.24	0.85	1.95	0.15
K2O	0.05	0.08	0.14	0.06	0.05	0.09	0.68	0.12	1.03	0.16
TIO2	0.77	1.14	0.61	1.06	0.98	0.41	1.03	1.55	0.66	1.34
MNO	0.16	0.20	0.15	0.19	0.15	0.36	0.29	0.36	0.13	0.09
P2O5	0.08	0.12	0.14	0.09	0.09	0.08	0.21	0.09	0.15	0.08
PPM										
BA	29	50	59	18	24	23	140	65	268	135
NB	1	1	1	1	1	1	4	1	4	4
ZR	9	22	27	5	7	26	105	14	112	18
Y	3	16	14	5	5	32	40	13	21	9
SR	297	323	300	211	234	227	209	216	331	431
RB	1	1	3	3	1	1	21	1	45	1
ZN	47	64	41	59	60	155	126	34	100	41
CU	3	27	12	6	21	21	42	33	10	51
NI	14	7	15	15	10	49	8	11	21	11
CIPW NORM										
QTZ	0.00	1.30	2.20	0.00	0.00	0.00	11.10	0.00	13.90	0.50
ORTH	0.30	0.50	0.80	0.40	0.30	0.50	4.10	0.70	6.10	1.00
ALB	0.10	3.50	9.00	0.10	0.10	9.40	19.10	7.20	16.60	1.30
ANOR	63.70	56.20	57.90	60.60	56.40	34.00	27.20	50.00	35.80	53.40
NEPH	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
DIOP	11.80	12.00	7.50	4.40	19.70	25.10	6.40	24.30	7.90	21.00
HYP	11.70	18.50	17.00	11.20	10.80	22.50	24.20	1.80	13.40	14.30
OLIV	4.50	0.00	0.00	17.30	5.80	5.20	0.00	4.80	0.00	0.00
MAG	6.20	5.50	4.10	3.80	4.80	2.30	5.40	8.00	4.70	5.80
ILM	1.50	2.20	1.20	2.00	1.90	0.80	2.00	3.00	1.30	2.60
APAT	0.20	0.30	0.30	0.20	0.20	0.20	0.50	0.20	0.40	0.20

LESSER ANTILLES PLUTONICS - APENDIX 2.3 - MAJORS, TRACES AND CIPW NORMS

	L703	L722	L782	BQ14	WCAU1	WCA48	WCA289	X254	X403	X407
PERCENT										
SIO2	53.55	55.13	52.97	42.86	40.46	43.01	43.65	42.73	43.62	44.87
AL203	15.17	15.54	16.97	16.18	17.24	15.80	21.24	13.22	22.37	9.01
FE203	10.21	11.84	8.10	11.53	14.58	11.73	10.38	12.16	8.72	10.64
MGO	7.62	4.83	7.82	10.95	10.47	11.81	5.48	13.59	6.25	14.40
CAO	10.31	8.55	10.45	14.40	14.13	14.91	18.12	15.25	17.57	19.02
NA2O	1.46	1.64	1.99	0.85	0.91	0.95	0.01	0.98	0.37	0.07
K2O	0.55	0.82	0.74	0.27	0.17	0.14	0.08	0.36	0.17	0.26
TIO2	0.85	1.15	0.72	2.72	1.79	1.33	0.82	1.43	0.72	1.39
MNO	0.18	0.23	0.14	0.16	0.17	0.22	0.11	0.16	0.09	0.15
P2O5	0.10	0.27	0.10	0.08	0.07	0.11	0.11	0.13	0.11	0.19
PPM										
BA	244	282	201	54	41	33	38	86	63	36
NB	6	3	2	3	1	2	1	1	1	4
ZR	88	134	74	41	25	38	20	41	41	60
Y	39	34	18	28	22	33	7	20	9	16
SR	289	235	280	255	293	306	497	408	925	215
RB	22	39	32	1	1	1	1	1	1	1
ZN	198	151	90	73	77	77	54	54	51	64
CU	2	8	16	49	150	48	3	2	1	2
NI	56	10	60	16	8	103	20	204	50	64
CIPW NORM										
QTZ	8.70	12.30	5.80	0.00	0.00	0.00	2.10	0.00	0.00	0.00
ORTH	3.30	4.90	4.40	1.60	1.00	0.80	0.50	2.10	1.00	1.10
ALB	12.50	14.00	16.90	7.10	3.00	5.60	0.10	2.50	3.20	0.00
ANOR	33.50	33.00	35.40	39.90	42.80	38.70	58.00	30.80	59.30	23.60
NEPH	0.00	0.00	0.00	0.10	2.60	1.30	0.00	3.20	0.00	0.30
DIOP	14.20	6.80	12.80	25.20	21.90	27.80	25.10	34.90	21.70	54.70
HYP	23.00	24.80	19.00	0.00	0.00	0.00	4.60	0.00	5.40	0.00
OLIV	0.00	0.00	0.00	16.00	16.90	16.10	0.00	14.60	0.70	8.60
MAG	3.00	1.30	4.10	4.70	8.20	6.80	7.80	8.90	7.10	8.10
ILM	1.60	2.20	1.40	5.20	3.40	2.50	1.60	2.70	1.40	2.70
APAT	0.20	0.60	0.20	0.20	0.20	0.30	0.30	0.30	0.30	0.50

APPENDIX 2:4

A GUIDE TO LESSER ANTILLES PLUTONIC MINERAL ANALYSES

This appendix is constructed, and can be used, in a similar way to appendix 1:4. It is considered necessary as a guide for there are 528 analyses listed in appendix 2:5. The first two pages (110,111) list the new analyses carried out during this project and are arranged geographically. The third page (112) lists other workers analyses - these are arranged historically, and references are given. For the new analyses the specimen numbers are those listed in appendix 2:1, but abbreviated identifiers were used during the probe work so that a reference to analytical details could be printed at the head of each analysis.

APENDIX 2.4 LIST OF LESSER ANTILLES PLUTONIC MINERAL ANALYSES

THE NUMBERS IN EACH COLUMN REFER TO A PARTICULAR MINERAL ANALYSIS IF MORE THAN ONE ANALYSIS PER MINERAL PER SPECIMEN WAS MADE THEN THEY ARE GIVEN AS 1-3 WHICH REFERS TO ANALYSES 1,2 AND 3

THE LISTS ARE GIVEN IN APENDIX 2.5 IN THE ORDER INDICATED 1-10

KEY

SPEC NO	=HAND SPECIMEN NUMBER (SEE APENDIX 2.1)	
PROBE NO	=NUMBER ALLOTTED TO POLISHED THIN SECTION DURING PROBE ANALYSIS	
PLAG	=PLAGIOCLASE	LIST 1
AMPH	=AMPHIBOLE	LISTS 2A+2B
CLPX	=CLINOPYROXENE	LIST 3
ORPX	=ORTHOPYROXENE	LIST 4
OLIV	=OLIVINE	LIST 5
SPIN	=SPINEL	LISTS 6A+6B
ILMN	=ILMENITE	LISTS 7A+7B
BIOT	=BIOTITE	LIST 8
SCOR	=INTERSTITIAL SCORIA	LISTS 9A+9B
GARN	=ST VINCENT GARNETS	LIST 10
A	=ABSENT	
ND	=NOT DETERMINED	

SPEC NO	PROBE NO	PLAG LIST 1	AMPH LIST 2A	CLPX LIST 3	ORPX LIST 4	OLIV LIST 5	SPIN LIST 6A	ILMN LIST 7A	BIOT LIST 8	SCOR LIST 9A
SABA										
SA6X	A1	1-3	1+2	A	1+2	A	ND	ND	A	A
ST EUSTATIUS										
SE31B	E2	4-7	3-5	1-4	3+4	1+2	1+2	A	A	A
SE48A	E3	8-10	6+7	5-8	5+6	A	3+4	A	A	1-4
SE48B	E4	11-13	8-10	A	A	A	A	A	A	5+6
ST KITTS										
K72	K1	14-17	11+12	9+10	A	3+4	5+6	A	A	A
K532	K2	18-21	13+14	11+12	7+8	5+6	7-11	1+2	A	A
K535	K3	22-25	15+16	13-15	9+10	A	12+13	3+4	A	A
K576	K4	ND	ND	A	11+12	7+8	ND	A	A	7+8
K642	K5	26-29	17+18	16-18	13+14	A	14+15	5+6	A	9+10
K674	K7	30-34	19-21	A	A	A	16+17	A	A	A
K678	K8	35-37	A	19+20	15+16	A	18	7	A	ND
K699	K9	ND	ND	21+22	17+18	ND	19-21	8	1	A
K700	K10	38-41	22-23	23+24	19-21	9+10	22	9	2+3	A
K701	K11	42-44	24-26	A	22-25	11+12	23	A	A	11+12
K740	K12	45-47	27-28	A	A	13+14	A	A	A	13-15
K745	K13	48-50	A	A	A	15+16	A	A	A	16+17
MONTSERRAT										
F592	F1	52-55	30-32	A	A	A	24+25	A	A	18-20
F593	F2	56-58	33+34	A	A	18+19	26+27	A	A	21-23
DOMINICA										
D170	D1	62-64	A	25-27	A	20+21	28	A	A	A
D214	D4	65-67	40+41	28+29	A	22	A	A	A	A
D218	D6	68+69	42+43	30+31	26+27	A	29	A	A	24+25
D250	D8	70-74	A	32+33	A	23+24	30+31	A	A	A
D366A	D12	75-77	A	34	A	25+26	ND	A	A	A
D375A	D14	78-81	A	35+36	A	27+28	32	A	A	26+27
D408	D16	82-85	A	37+38	28+29	29+30	33	A	A	A
D409	D17	86-88	44+45	39+40	A	31+32	34+35	A	A	A
D410	D18	89-92	46+47	41+42	30+31	A	36+37	A	A	A
D411	D20	93-95	48+49	43	32	33	38	10	A	A
D418	D21	96-98	50+51	44+45	33	34+35	39	A	A	A

SPEC NO	PROBE NO	PLAG LIST 1	AMPH LIST 2A	CLPX LIST 3	ORPX LIST 4	OLIV LIST 5	SPIN LIST 6A	ILMN LIST 7A	BIOT LIST 8	SCOR LIST 9A
MARTINIQUE										
M29	M1	99-101	52+53	46+47	34+35	A	40	11	A	A
M131	M2	102-104	54+55	48+49	36+37	A	41	12	A	28+29
ST LUCIA										
L461	L1	105-107	56+57	50+51	38+39	36+37	42+43	13+14	A	30-32
L628A	L2	108-110	58+59	52+53	A	A	44	A	A	33+34
L628C	L4	111-113	60+61	54+55	40+41	A	45	A	A	35
L703	L5	ND	ND	A	A	A	ND	A	6	A
L722	L6	114-116	62-64	56+57	42+43	A	A	15	4+5	A
L861	L9	117-118	A	58+59	A	A	46+47	A	A	A
LU1UWI	L10	119-121	65-66	60+61	A	A	48+49	A	A	36+37
ST VINCENT										
V370	V1	122-124	67-68	62-64	A	38+39	50+51	A	A	38-40
V472	V2	125	A	65-69	A	A	A	A	A	A
GRENADINES										
BQ14	B1	132+133	73+74	77+78	A	47+48	A	16	A	A
WCAUWI	C1	134-136	75+76	79+80	A	A	52+53	A	A	A
WCA48	C2	137+138	77+78	81+82	A	A	54+55	A	A	A
WCA289	C3	139-142	79+80	83-85	A	A	56+57	A	A	A
GRENADA										
X254	X1	143-145	81+82	86-88	A	49+50	58+59	A	A	A
X403	X2	146-148	83+84	89+90	A	A	60+61	A	A	41-43
X407	X3	149+150	85+86	91+92	A	51+52	62+63	A	A	A
X418	X4	A	A	93-95	44-46	53-55	A	A	A	A

OTHER WORKERS ANALYSES LISTED

A =ABSENT
ND=NOT DETERMINED
NL=NOT LISTED - PARTIAL ANALYSIS
U =NOT KNOWN IF PRESENT

AUTHORS SPEC NO	LIST NO	PLAG LIST 1	AMPH LIST 2A	CLPX LIST 3	ORPX LIST 4	OLIV LIST 5	MAGN LIST 6B	SCOR LIST 9B
ST VINCENT (A.LACROIX 1949 - RECALCULATED BY LEWIS 1964 TABLE 40)								
2ND ANAL	VLAC	U	U	U	U	U	U	22
ST VINCENT (J.LEWIS 1964)								
T731	JLV731	U	U	70	A	U	U	U
T736	JLV736	NL	69	ND	A	ND	ND	A
T740	JLV740	129	A	A	A	40	A	A
T745B	JLV745	U	U	U	A	U	U	20
T748A	JLV748	ND	ND	71	A	NL	NL	A
T770	JLV770	130	70	72	A	41	ND	21
T774M	JLV774	131	71	73	A	42	65+66	A
T896	JLV896	ND	72	74	A	43	NL	A
MONTSERRAT (J.REA 1970)								
18592	JR47C	ND	35	A	A	A	ND	ND
18593	JR47D	NL	36	A	A	58	ND	ND
ST KITTS,MONTSERRAT AND ST VINCENT (MACREATH 1972)								
K1(14589)	IMK1	51	29	A	A	17	A	8
M1(18593)	IMF1	59	37	A	A	ND	A	ND
M2(18687)	IMF2	60	38	A	A	A	ND	ND
M3(18703)	IMF3	61	39	A	A	A	ND	ND
V1(25354)	IMV1	126	A	ND	A	44	A	ND
V2(25353)	IMV2	127	ND	75	A	45	ND	ND
V3(25360)	IMV3	128	ND	76	A	46	ND	ND
GRENADA (R.ARCULUS 1973)								
X245	RAX245	A	87	96	A	57	64	A

APPENDIX TABLE 2

AMPHIBOLE OXIDATION STATES

Specimen No	Fe_2O_3	FeO	$\frac{100Fe_2O_3}{FeO + Fe_2O_3}$	$\frac{100Mg^{2+}}{Mg^{2+}+Fe^{2+}+Fe^{3+}+Mn^{2+}}$
This work				
SE48B	5.08	5.77	46.8	71.7
K72	4.14	8.18	33.6	67.7
K740	3.95	6.27	38.6	73.0
F592	4.18	7.01	37.4	69.1
F593	4.63	7.19	39.2	69.4
D214	4.40	7.72	36.3	68.6
D411	4.43	4.83	47.8	75.0
LUIUWI	4.88	6.89	41.5	68.6
WCAUWI	5.69	6.69	46.0	67.2
WCA48	5.36	7.07	43.1	67.6
X254	5.02	5.88	46.1	71.3
X403	6.03	6.51	48.1	67.4
Lewis (1964, p.97)				
T770	4.40	6.66	39.8	71.7
T896	4.60	6.78	40.4	70.5
T736	4.94	6.85	41.9	69.6
T774	5.23	7.40	41.4	67.4
Rea (1970, p.79)				
47C	4.42	7.06	38.5	72.1
47D	5.00	6.81	42.3	71.0
Sigurdsson (1974 in press)				
KEJ018A	4.94	5.34	41.1	70.0
KEJ020A	5.07	5.89	46.3	66.0

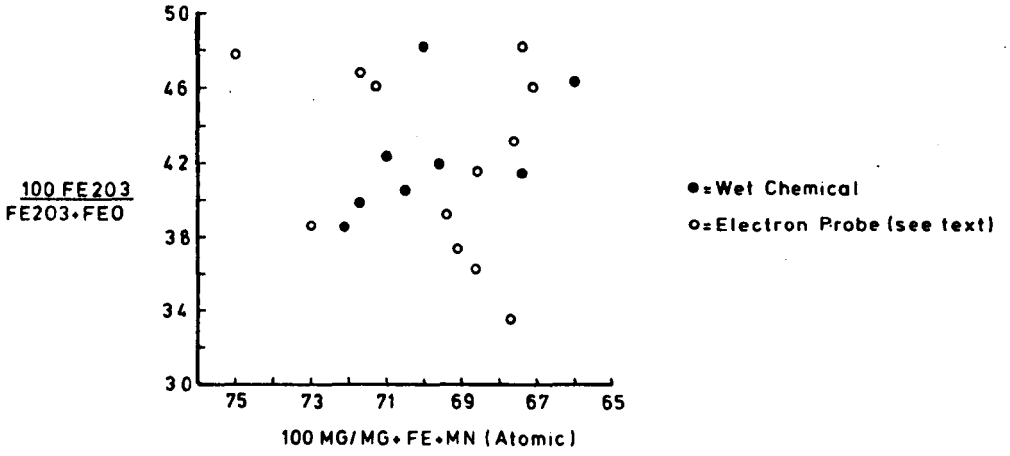
APPENDIX 2:5

LESSER ANTILLES PLUTONIC MINERAL ANALYSES

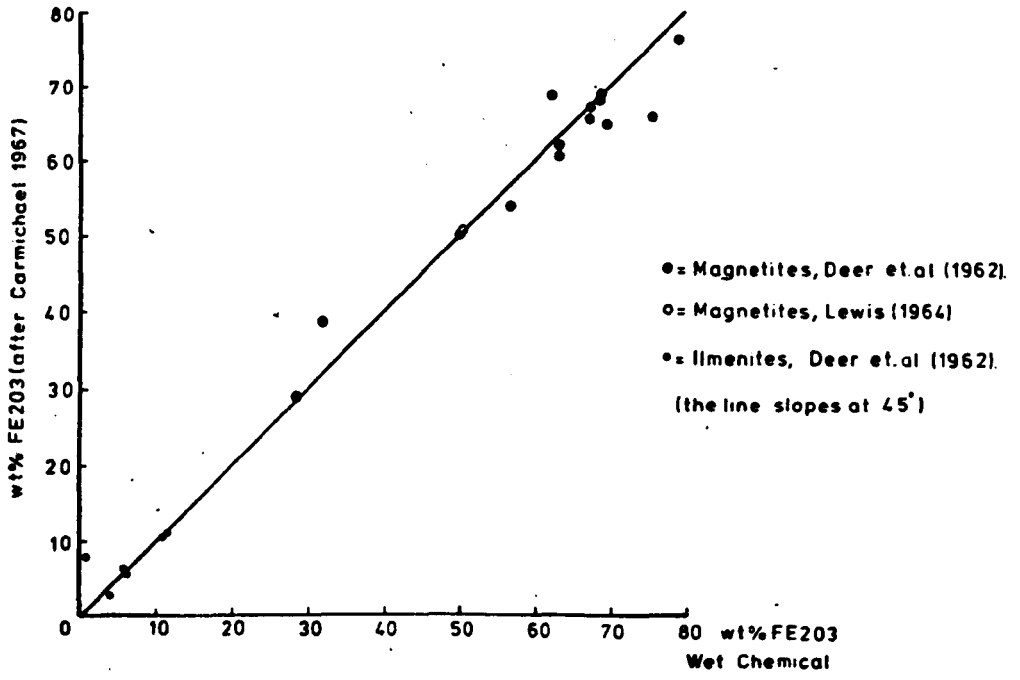
Techniques and analytical conditions have been described in appendix 1:5 p. 69.

$Fe^{3+}/Fe^{2+} + Fe^{3+}$ Distribution in Amphiboles

The probe analyses express all Fe as FeO, so it is necessary to make some estimate of the $Fe^{3+}/Fe^{2+} + Fe^{3+}$ distribution. This is of considerable importance in amphiboles because of its control on cation-site distribution. Other workers have tried a number of indirect methods, for instance Heltz (1973), Ross and others (1969). In this work it was decided to avoid these methods if possible. Accordingly sufficient material for FeO determinations was hand picked from coarsely crushed nodules under a binocular microscope. Only coarse unoxidised and inclusion-free amphiboles were used so that the material was as fresh and uncontaminated as possible. Fortunately the crystals are relatively unzoned, and simple averages of the probe total Fe expressed as FeO will approximate to the total Fe in whole crystals. Twelve specimens were considered to fulfill the above conditions, the ferrous/ferric iron distribution has been calculated, and the results given in appendix Table 2. There are also 8 wet chemical analyses of Lesser Antillies amphiboles known to the writer. Four are from St Vincent (Lewis, 1964), two from Montserrat (Rea, 1970) and two from Kick-em-Jenny, a submarine volcano in the Grenadines (Sigurdsson and Shepherd, 1974 in press). These 8 analyses all contain Fe_2O_3 and FeO determinations which are also listed with oxidation ratios and Mg-numbers in appendix Table 2. The value 100 $Fe_2O_3/FeO + Fe_2O_3$ shows a relatively small range from 34 to 48 in these determinations. An average value of 38 has been taken in the calculations of cation-site distributions, and has



Appendix Fig. 2·1. Plot of Mg-numbers versus oxidation ratio for Lesser Antilles amphiboles.



Appendix Fig. 2·2. Determination of Fe_2O_3 in oxides.

been applied to all the analyses in appendix 2:5, list 2B. ($Fe_2O_3/FeO = 0.68$).

The calculations of cation-site distributions on 87 analyses have been considerably simplified thanks to the computer program "MINDATA4.1", which was kindly made available by Mr J.L. Knight (1974 in preparation). This is a modified version of "MINDATA3" written by Mr R. Phillips in 1965 (pers. comm.). With 20 ferrous/ferric iron determinations available, it would be hoped that some regular variation could be found. However, it can be seen in appendix fig. 2.1 that although the range of $100\ Fe_2O_3/FeO + Fe_2O_3$ is restricted, it shows no regular variation when plotted, against $100\ Mg^{2+}/Mg^{2+} + Fe^{2+} + Fe^{3+} + Mn^{2+}$. Unfortunately, those amphiboles with higher Fe/Mg ratios are not easy to separate, so their iron oxidation state is not known. If only the wet-chemical analyses are considered, there are indications of an increase in Fe^{3+}/Fe^{2+} as the Fe/Mg ratio of the mineral increases. This could be interpreted as an increase in oxidation during cooling.

$\underline{Fe^{3+}/Fe^{2+} + Fe^{3+}\ \text{Distribution in Oxides}}$.

Ferrous/ferric iron distribution in the oxide minerals was estimated after the method of Carmichael (1967). The method was simply evaluated by using the analyses of magnetites and ilmenites quoted in Deer, Howie and Zussman (volume 5, 1962). All Fe was recalculated to FeO before the analyses were run through the "TABLIT" program. The resulting Fe_2O_3 values are plotted against the original analysts wet chemically determined Fe_2O_3 value in appendix fig. 2.2. As the oxides are from various geological environments, the agreement is considered good, and certainly sufficiently accurate for the present purposes. The same procedure

was adopted for the two magnetite analyses from St. Vincent given by Lewis (1964, p.118), here the agreement is even better. Wet-chemically determined Fe_2O_3 values are 50.04 and 50.02,whilst using Carmichael's method values of 50.63 and 50.38, respectively, are obtained. In appendic es 6B and 7B these estimated ferrous/ferric iron distributions are used in the calculation of atomic proportions.

Interstitial Scoria Analyses

As noted previously, for the scoria analyses the electron beam was defocussed,and the specimen current reduced to 0.2μA. The main problem was in finding a sufficiently-large patch of interstitial glass with a smooth surface and adequate carbon coating. This was because the scoria's natural vesicularity and friability caused considerable plucking out during polished thin section preparation. Of the primary probe totals for the 9 elements Si, Ti, Al, Fe, Mn, Mg, Ca, Na and K, 80% are in the range 95 to 100%. However 2 are as low as 85%, which cannot be explained by non-analysis for volatiles. Lewis (1964, p.178) records H_2O^+ values of only 0.25 and 0.23% in his scoria analyses. The problem of low totals, primarily caused by bad conduction of surface electrons, is largely surmounted by the later normalisation to 100%.

Another problem is the presence of small microlites, particularly of oxides and plagioclase. Usually these could be avoided, but in some analyses, eg list 9A, no 13, plagioclase contamination is apparent. At least 2, but normally 3 or 4 interstitial-glass analyses were made from each section. In the cases where there are few microlites eg specimen E3, list 9A, nos 1-4, the similarity between the analyses is convincing. For comparison with other Lesser Antill es volcanic rocks, the scoria analyses have been averaged, recalculated to 100% and their norms calculated - they are presented in list 9B. For the norm

calculation, a 100 $Fe_2O_3/FeO + Fe_2O_3$ value of 28.6 has been taken after the average value determined from Dominica volcanics. The two oxidation values from scorias determined by Lewis (1964, p.178) are 22 and 32, so the present extrapolation seems reasonable.

THE ANALYSES

This appendix lists all the analyses of Lesser Antillies plutonic minerals known to the writer. The analyses are arranged by mineral group as indicated in appendix 2:4. For most minerals, the atomic proportions based on the number of oxygens in the unit cell, and end member compositions, are also given. Amphiboles, spinels, ilmenites and interstitial scorias are listed twice. Lists 2A, 6A, 7A and 9A present the original probe analyses, whilst in lists 2B, 6B and 7B an attempt has been made to distribute the Fe between Fe^{2+} and Fe^{3+}. In list 9B the scoria analyses are recalculated to 100%. These methods have been described above.

The identifiers underneath the analyses numbers give additional details. The maximum number of characters possible in the program is 8. For the new analyses these have been split between letters (L), and numbers (N), in the following pattern - NNNLNNLN. This sequence has been subdivided into 3 sections as follows:

NNN - LNN - LN

The first 3 numbers (NNN) are the analytical-reference numbers used in the writer's probe log-book. This contains analytical conditions, dates and details. The second 3 characters (LNN) are the abbreviated specimen identifiers given to the probe sections as listed in appendix 2:4. A list of island abbreviations is given below. The third 2 characters (LN) signify the type of mineral analysed and the exact spot as recorded on the photographs. Some examples are given:

a) List 1 - plagioclases - analysis 1 - ref = 36A1P1, read 36-A1-P1.

= log-book ref 36, specimen A1 (Saba 6X), plagioclase spot 1.

b) Lists 2A and 2B - amphiboles - analysis 51.

ref = 395D21A2, read 395-D21-A2.

= log-book ref 395, specimen D21 (Dominica 418), amphibole spot 2.

If the analysis is by another worker, then the identifier is of a different form - LL - LNNN - LN. Here the first 2 letters are the initials of the worker eg JL, JR, IM or RA (see appendix 2:4). The rest of the identifier is like those for the new analyses, namely a specimen number and the type of mineral analysed.

example, List 1 - plagioclases - analysis 131.

ref = JLV774P1, read JL-V774-P1.

= analysis by J. Lewis, specimen St. Vincent 774, plagioclase.

The following abbreviations are used in these identifiers:

islands (north to south)			minerals		
A	=	Saba	P	=	plagioclase - list 1
E	=	St. Eustatius	A	=	amphibole - list 2A,2B
K	=	St. Kitts	L	=	clinopyroxene - list 3
F	=	Montserrat	F	=	fassaite - list 3
D	=	Dominica	W	=	wollastonite - list 3
M	=	Martinique	R	=	orthopyroxene - list 4
L	=	St. Lucia	O	=	olivine - list 5
V	=	St. Vincent	M	=	magnetite - list 6A,6B
B	=	Bequia	S	=	spinel - list 6A,6B
C	=	Carriacou	T	=	ilmenite - list 7A,7B
X	=	Grenada	B	=	biotite - list 8
			N	=	garnet - list 10

LESSER ANTILLES PLUTONICS - LIST 1 - PLAGIOCLASES

	1	2	3	4	5	6	7	8	9	10
	36A1P1	37A1P2	38A1P3	32E2P1	33E2P2	34E2P3	35E2P4	66E3P1	67E3P2	68E3P3
OXIDE WEIGHT PERCENTAGE										
SIO2	52.66	48.14	57.49	45.65	45.62	44.47	45.56	45.21	43.83	45.08
TIO2	0.02	0.03	0.04	0.07	0.04	0.05	0.02	N D	N D	N D
AL2O3	29.72	32.36	26.12	35.14	33.88	34.26	34.47	34.12	35.07	34.32
FEO	0.35	0.21	0.23	0.41	0.61	0.45	0.40	0.54	0.55	0.57
MGO	0.08	0.02	0.07	0.13	0.05	0.12	0.08	N D	N D	N D
CAO	12.93	16.68	9.11	18.48	18.67	18.79	18.08	18.71	19.05	18.23
K2O	0.14	0.04	0.28	0.01	0.01	0.01	0.02	-	0.02	0.05
NA2O	4.41	2.61	6.35	0.91	1.13	1.19	1.10	1.23	0.74	0.89
TOTAL	100.31	100.09	99.69	100.80	100.01	99.34	99.73	99.81	99.26	99.14
ATOMIC PROPORTIONS ON THE BASIS OF 8 OXYGENS										
SI	2.386	2.211	2.589	2.089	2.111	2.075	2.106	2.097	2.047	2.099
TI	0.001	0.001	0.001	0.002	0.001	0.002	0.001	0.000	0.000	0.000
AL	1.588	1.752	1.387	1.896	1.848	1.885	1.879	1.866	1.931	1.885
FE2	0.013	0.008	0.009	0.016	0.024	0.018	0.015	0.021	0.021	0.022
MG	0.005	0.001	0.005	0.009	0.003	0.008	0.006	0.000	0.000	0.000
CA	0.628	0.821	0.440	0.906	0.926	0.939	0.896	0.930	0.953	0.910
K	0.008	0.002	0.016	0.001	0.001	0.001	0.001	0.000	0.001	0.003
NA	0.388	0.233	0.555	0.081	0.101	0.108	0.099	0.111	0.067	0.080
END MEMBER COMPOSITIONS										
AB	37.87	22.02	54.90	8.18	9.87	10.28	9.91	10.63	6.56	8.10
AN	61.34	77.75	43.51	91.76	90.07	89.66	89.97	89.37	93.32	91.61
OR	0.79	0.22	1.59	0.06	0.06	0.06	0.12	0.00	0.12	0.30

LESSER ANTILLES PLUTONICS - LIST 1 - PLAGIOCLASES

	11	12	13	14	15	16	17	18	19	20
	69E4P1	70E4P2	71E4P3	81K1P1	82K1P2	83K1P3	84K1P4	85K2P1	86K2P2	87K2P3
OXIDE WEIGHT PERCENTAGE										
SIO2	44.45	44.55	44.26	44.78	44.61	45.20	45.05	44.94	45.15	51.97
TIO2	N D	N D	N D	N D	N D	N D	N D	N D	N D	N D
AL203	34.73	34.49	35.19	35.15	35.33	35.60	35.10	34.62	35.10	30.35
FEO	0.46	0.43	0.51	0.49	0.44	0.57	0.50	0.43	0.43	0.45
MGO	N D	N D	N D	N D	N D	N D	N D	N D	N D	N D
CAO	19.87	19.53	20.13	18.72	18.77	18.60	18.47	19.12	19.04	13.45
K2O	0.05	0.03	0.03	0.03	0.03	0.04	0.03	0.04	0.03	0.10
NA2O	0.64	0.80	0.45	0.89	0.65	0.87	1.10	1.04	1.05	4.00
TOTAL	100.20	99.83	100.57	100.06	99.83	100.88	100.25	100.19	100.80	100.32
ATOMIC PROPORTIONS ON THE BASIS OF 8 OXYGENS										
SI	2.059	2.073	2.044	2.070	2.065	2.070	2.077	2.078	2.074	2.357
TI	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
AL	1.897	1.889	1.916	1.915	1.928	1.923	1.908	1.888	1.901	1.623
FE2	0.018	0.017	0.020	0.019	0.017	0.022	0.019	0.017	0.017	0.017
MG	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
CA	0.987	0.972	0.996	0.927	0.931	0.913	0.913	0.948	0.937	0.654
K	0.003	0.002	0.002	0.002	0.002	0.002	0.002	0.002	0.002	0.006
NA	0.058	0.072	0.040	0.080	0.058	0.077	0.098	0.093	0.094	0.352
END MEMBER COMPOSITIONS										
AB	5.49	6.89	3.88	7.91	5.89	7.79	9.71	8.94	9.06	34.79
AN	94.22	92.94	95.95	91.91	93.93	91.98	90.11	90.83	90.77	64.63
OR	0.28	0.17	0.17	0.18	0.18	0.24	0.17	0.23	0.17	0.57

LESSER ANTILLES PLUTONICS - LIST 1 - PLAGIOCLASES

	21	22	23	24	25	26	27	28	29	30
	88K2P4	89K3P1	90K3P2	91K3P3	92K3P4	184K5P1	185K5P2	186K5P3	187K5P4	188K7P1
OXIDE WEIGHT PERCENTAGE										
SIO2	44.67	47.75	52.77	47.82	54.60	46.16	47.72	47.80	49.09	45.02
TIO2	N.D	N.D	N.D	N.D	N.D	0.03	0.03	0.08	0.09	0.07
AL203	35.67	33.31	29.80	32.99	28.79	33.73	32.61	32.92	31.70	34.79
FEO	0.38	0.45	0.42	0.40	0.34	0.35	0.49	0.48	0.48	0.58
MGO	N.D	N.D	N.D	N.D	N.D	0.09	0.02	0.10	0.08	0.07
CAO	19.15	17.25	12.76	16.86	11.63	18.13	16.80	16.84	14.95	19.02
K2O	0.03	0.05	0.09	0.06	0.11	0.06	0.07	0.06	0.07	0.03
NA2O	0.89	2.05	4.86	2.51	5.05	1.32	2.14	2.42	2.60	1.03
TOTAL	100.79	100.86	100.70	100.64	100.52	99.87	99.88	100.70	99.06	100.61
ATOMIC PROPORTIONS ON THE BASIS OF 8 OXYGENS										
SI	2.052	2.179	2.384	2.188	2.456	2.132	2.197	2.186	2.264	2.074
TI	0.000	0.000	0.000	0.000	0.000	0.001	0.001	0.003	0.003	0.002
AL	1.932	1.792	1.588	1.779	1.527	1.837	1.770	1.775	1.723	1.889
FE2	0.015	0.017	0.016	0.015	0.013	0.014	0.019	0.018	0.019	0.022
MG	0.000	0.000	0.000	0.000	0.000	0.006	0.001	0.007	0.005	0.005
CA	0.943	0.844	0.618	0.827	0.561	0.897	0.829	0.825	0.739	0.939
K	0.002	0.003	0.005	0.004	0.006	0.004	0.004	0.004	0.004	0.002
NA	0.079	0.181	0.426	0.223	0.441	0.118	0.191	0.215	0.233	0.092
END MEMBER COMPOSITIONS										
AB	7.75	17.65	40.61	21.16	43.73	11.60	18.66	20.57	23.84	8.91
AN	92.08	82.06	58.90	78.51	55.64	88.05	80.94	79.09	75.74	90.92
OR	0.17	0.28	0.49	0.33	0.63	0.35	0.40	0.34	0.42	0.17

LESSER ANTILLES PLUTONICS - LIST 1 - PLAGIOCLASES

	31	32	33	34	35	36	37	38	39	40
	202K7P2	203K7P3	204K7P4	205K7P5	151K8P1	152K8P2	153K8P3	206K10P1	207K10P2	208K10P3
OXIDE WEIGHT PERCENTAGE										
SIO2	44.52	44.68	45.48	44.49	57.24	57.81	58.64	44.79	58.97	46.15
TIO2	0.09	0.10	0.07	0.05	0.03	0.03	0.03	0.04	0.04	0.07
AL2O3	34.32	34.15	32.92	34.04	26.53	26.34	25.15	33.13	24.59	32.77
FEO	0.26	0.33	0.27	0.46	0.32	0.27	0.29	0.06	-	0.22
MGO	0.20	0.30	0.26	0.28	0.30	0.14	0.01	0.21	0.14	0.11
CAO	19.15	17.92	19.20	19.17	8.81	9.33	8.80	19.55	7.85	18.30
K2O	0.05	0.03	0.02	0.01	0.30	0.49	0.41	0.03	0.41	0.05
NA2O	1.00	1.59	1.17	1.17	6.19	5.32	6.23	1.30	7.51	3.02
TOTAL	99.59	99.10	99.39	99.67	99.72	99.73	99.56	99.11	99.51	100.69
ATOMIC PROPORTIONS ON THE BASIS OF 8 OXYGENS										
SI	2.072	2.085	2.120	2.072	2.575	2.596	2.638	2.097	2.655	2.131
TI	0.003	0.004	0.002	0.002	0.001	0.001	0.001	0.001	0.001	0.002
AL	1.883	1.879	1.809	1.869	1.407	1.394	1.334	1.829	1.305	1.784
FE2	0.010	0.013	0.011	0.018	0.012	0.010	0.011	0.002	0.000	0.008
MG	0.014	0.021	0.018	0.019	0.020	0.009	0.001	0.015	0.009	0.008
CA	0.955	0.896	0.959	0.957	0.425	0.449	0.424	0.981	0.379	0.905
K	0.003	0.002	0.001	0.001	0.017	0.028	0.024	0.002	0.024	0.003
NA	0.090	0.144	0.106	0.106	0.540	0.463	0.544	0.118	0.656	0.270
END MEMBER COMPOSITIONS										
AB	8.61	13.81	9.92	9.94	55.00	49.27	54.84	10.73	61.98	22.94
AN	91.11	86.01	89.96	90.00	43.25	47.74	42.79	89.11	35.79	76.81
OR	0.28	0.17	0.11	0.06	1.75	2.99	2.37	0.16	2.23	0.25

LESSER ANTILLES PLUTONICS - LIST 1 - PLAGIOCLASES

	41	42	43	44	45	46	47	48	49	50
	209K10P4	158K11P1	159K11P2	160K11P3	456K12P1	457K12P2	458K12P3	155K13P1	156K13P2	157K13P3
OXIDE WEIGHT PERCENTAGE										
SIO2	58.55	45.56	44.09	44.12	44.31	46.34	44.41	44.63	46.21	44.85
TIO2	0.06	0.05	0.07	0.06	0.05	0.07	0.03	0.04	0.04	0.05
AL2O3	24.98	33.71	34.02	34.59	35.20	33.10	34.76	34.40	32.89	34.26
FEO	0.09	0.42	0.46	0.43	0.44	0.66	0.63	0.31	0.35	0.43
MGO	0.13	0.18	0.21	0.22	0.03	0.12	0.09	0.19	0.26	0.28
CAO	7.54	18.74	19.19	19.17	19.20	17.55	18.58	19.47	19.24	19.41
K2O	0.94	0.01	0.02	0.02	0.03	0.02	0.02	0.02	0.04	0.02
NA2O	6.89	1.05	1.16	1.36	0.65	1.44	0.78	0.78	1.17	0.82
TOTAL	99.18	99.72	99.22	99.97	99.91	99.30	99.30	99.84	100.20	100.12
ATOMIC PROPORTIONS ON THE BASIS OF 8 OXYGENS										
SI	2.646	2.112	2.064	2.051	2.054	2.152	2.069	2.072	2.135	2.077
TI	0.002	0.002	0.002	0.002	0.002	0.002	0.001	0.001	0.001	0.002
AL	1.331	1.843	1.878	1.896	1.924	1.812	1.910	1.883	1.792	1.870
FE2	0.003	0.016	0.018	0.017	0.017	0.026	0.025	0.012	0.014	0.017
MG	0.009	0.012	0.015	0.015	0.002	0.008	0.006	0.013	0.018	0.019
CA	0.365	0.931	0.963	0.955	0.954	0.873	0.928	0.969	0.953	0.963
K	0.054	0.001	0.001	0.001	0.002	0.001	0.001	0.001	0.002	0.001
NA	0.604	0.094	0.105	0.123	0.058	0.130	0.071	0.070	0.105	0.074
END MEMBER COMPOSITIONS										
AB	59.02	9.20	9.85	11.37	5.76	12.92	7.05	6.75	9.89	7.10
AN	35.68	90.74	90.04	88.52	94.06	86.97	92.83	93.13	89.88	92.79
OR	5.30	0.06	0.11	0.11	0.18	0.12	0.12	0.11	0.22	0.11

LESSER ANTILLES PLUTONICS - LIST 1 - PLAGIOCLASES

	51	52	53	54	55	56	57	58	59	60
	I4K1P1	161F1P1	162F1P2	163F1P3	164F1P4	436F2P1	437F2P2	438F2P3	IMF1P1	IMF2P1
OXIDE WEIGHT PERCENTAGE										
SIO2	43.10	44.60	44.33	45.34	44.09	44.70	45.37	45.18	44.30	44.60
TIO2	-	0.03	0.05	0.07	0.04	0.06	0.06	0.04	-	-
AL2O3	36.00	34.56	34.74	34.18	34.96	34.65	34.48	34.57	34.20	34.70
FEO	0.37	0.48	0.41	0.49	0.41	0.42	0.44	0.50	0.36	0.54
MGO	TR.	0.22	0.10	0.27	0.14	0.14	0.08	0.04	TR.	TR.
CAO	19.60	19.19	19.14	18.83	19.42	18.57	18.65	18.48	18.90	18.50
K2O	0.05	0.02	-	0.02	0.03	0.03	0.04	0.02	TR.	0.03
NA2O	0.52	0.99	1.15	1.45	1.08	0.95	0.98	0.97	0.71	0.70
TOTAL	99.64	100.09	99.92	100.65	100.17	99.52	100.10	99.80	98.47	99.07
ATOMIC PROPORTIONS ON THE BASIS OF 8 OXYGENS										
SI	2.008	2.067	2.058	2.089	2.045	2.077	2.095	2.092	2.081	2.080
TI	0.000	0.001	0.002	0.002	0.001	0.002	0.002	0.001	0.000	0.000
AL	1.977	1.888	1.902	1.857	1.912	1.898	1.877	1.887	1.894	1.908
FE2	0.014	0.019	0.016	0.019	0.016	0.016	0.017	0.019	0.014	0.021
MG	0.000	0.015	0.007	0.019	0.010	0.010	0.006	0.003	0.000	0.000
CA	0.979	0.953	0.952	0.930	0.965	0.925	0.923	0.917	0.951	0.925
K	0.003	0.001	0.000	0.001	0.002	0.002	0.002	0.001	0.000	0.002
NA	0.047	0.089	0.104	0.130	0.097	0.086	0.088	0.087	0.065	0.063
END MEMBER COMPOSITIONS										
AB	4.57	8.53	9.81	12.22	9.13	8.46	8.67	8.67	6.37	6.40
AN	95.14	91.36	90.19	87.67	90.70	91.36	91.10	91.22	93.63	93.42
OR	0.29	0.11	0.00	0.11	0.17	0.18	0.23	0.12	0.00	0.18

LESSER ANTILLES PLUTONICS - LIST 1 - PLAGIOCLASES

	61	62	63	64	65	66	67	68	69	70
	IMF3P1	72D1P1	73D1P2	74D1P3	75D4P1	76D4P2	77D4P3	469D6P1	470D6P2	451D8P1
OXIDE WEIGHT PERCENTAGE										
SIO2	44.10	44.64	43.44	44.85	45.52	44.55	44.20	46.96	56.37	45.18
TIO2	-	N D	N D	N D	N D	N D	N D	0.02	0.03	0.06
AL2O3	34.10	34.14	34.52	34.43	35.16	34.44	34.81	33.41	27.17	34.05
FEO	0.42	0.64	0.56	0.64	0.44	0.48	0.46	0.28	0.30	0.55
MGO	TR.	N D	N D	N D	N D	N D	N D	0.01	-	0.02
CAO	18.30	18.57	19.72	19.20	19.23	18.95	19.44	16.84	9.80	18.49
K2O	TR.	0.05	0.03	0.04	0.03	0.04	0.07	0.05	0.20	0.02
NA2O	0.68	1.22	0.77	0.88	0.55	0.65	0.69	1.94	5.42	1.06
TOTAL	97.60	99.26	99.04	100.04	100.93	99.11	99.67	99.51	99.29	99.43
ATOMIC PROPORTIONS ON THE BASIS OF 8 OXYGENS										
SI	2.086	2.085	2.041	2.079	2.084	2.083	2.057	2.168	2.548	2.101
TI	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.001	0.001	0.002
AL	1.902	1.880	1.912	1.882	1.898	1.895	1.910	1.819	1.448	1.867
FE2	0.017	0.025	0.022	0.025	0.017	0.019	0.018	0.011	0.011	0.021
MG	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.001	0.000	0.001
CA	0.928	0.929	0.993	0.954	0.943	0.948	0.970	0.833	0.475	0.921
K	0.000	0.003	0.002	0.002	0.002	0.002	0.004	0.003	0.012	0.001
NA	0.062	0.111	0.070	0.079	0.049	0.059	0.062	0.174	0.475	0.096
END MEMBER COMPOSITIONS										
AB	6.30	10.60	6.59	7.64	4.91	5.83	6.01	17.20	49.43	9.39
AN	93.70	89.12	93.24	92.13	94.91	93.93	93.59	82.50	49.37	90.49
OR	0.00	0.29	0.17	0.23	0.18	0.24	0.40	0.29	1.20	0.12

LESSER ANTILLES PLUTONICS - LIST 1 - PLAGIOCLASES

	71	72	73	74	75	76	77	78	79	80
	452D8P2	453D8P3	454D8P4	455D8P5	78D12P1	79D12P2	80D12P3	11D14P1	12D14P2	13D14P3
OXIDE WEIGHT PERCENTAGE										
SIO2	44.17	44.48	44.07	45.30	44.50	46.04	44.74	44.43	44.91	44.09
TIO2	0.06	0.05	0.08	0.05	N D	N D	N D	0.01	0.05	-
AL2O3	34.58	34.55	34.60	33.89	34.20	34.50	35.18	34.89	34.11	35.05
FEO	0.53	0.48	0.57	0.45	0.53	0.55	0.53	0.47	0.44	0.50
MGO	0.06	0.08	0.05	0.06	N D	N D	N D	0.08	0.10	0.11
CAO	19.12	18.86	18.95	18.22	19.08	17.58	19.20	19.21	18.20	19.43
K2O	0.05	0.01	0.05	0.06	0.01	0.02	0.04	-	0.04	0.01
NA2O	0.93	0.96	0.87	1.54	1.08	1.27	0.94	0.89	1.22	0.97
TOTAL	99.50	99.47	99.24	99.57	99.40	99.96	100.63	99.98	99.07	100.16
ATOMIC PROPORTIONS ON THE BASIS OF 8 OXYGENS										
SI	2.060	2.071	2.059	2.105	2.077	2.121	2.061	2.060	2.095	2.044
TI	0.002	0.002	0.003	0.002	0.000	0.000	0.000	0.000	0.002	0.000
AL	1.901	1.897	1.906	1.857	1.882	1.874	1.911	1.907	1.876	1.916
FE2	0.021	0.019	0.022	0.017	0.021	0.021	0.020	0.018	0.017	0.019
MG	0.004	0.006	0.003	0.004	0.000	0.000	0.000	0.006	0.007	0.008
CA	0.956	0.941	0.949	0.907	0.954	0.868	0.948	0.954	0.910	0.966
K	0.003	0.001	0.003	0.004	0.001	0.001	0.002	0.000	0.002	0.001
NA	0.084	0.087	0.079	0.139	0.098	0.113	0.084	0.080	0.110	0.087
END MEMBER COMPOSITIONS										
AB	8.07	8.43	7.65	13.22	9.29	11.55	8.12	7.74	10.80	8.28
AN	91.65	91.51	92.06	86.44	90.65	88.33	91.65	92.26	88.97	91.66
OR	0.29	0.06	0.29	0.34	0.06	0.12	0.23	0.00	0.23	0.06

LESSER ANTILLES PLUTONICS - LIST 1 - PLAGIOCLASES

	81	82	83	84	85	86	87	88	89	90
	14D14P4	15D16P1	16D16P2	17D16P3	18D16P4	448D17P1	449D17P2	450D17P3	462D18P1	463D18P2
OXIDE WEIGHT PERCENTAGE										
SIO2	45.57	45.13	45.84	45.67	45.01	44.58	44.35	43.97	44.68	48.36
TIO2	0.07	0.02	-	0.04	0.04	0.05	0.04	0.01	0.04	0.04
AL2O3	33.63	35.13	33.85	34.36	34.02	35.03	35.02	35.20	34.47	32.25
FEO	0.70	0.43	0.60	0.45	0.46	0.41	0.58	0.60	0.44	0.44
MGO	0.13	0.05	0.13	0.10	0.11	0.07	0.08	0.02	0.02	0.08
CAO	18.60	18.13	16.55	18.05	19.67	18.78	19.05	19.10	19.10	16.22
K2O	0.08	0.01	0.01	0.02	-	0.02	0.05	0.04	0.03	0.05
NA2O	1.39	0.82	3.60	1.20	1.20	0.74	0.83	0.86	1.03	2.57
TOTAL	100.17	99.72	100.58	99.89	100.51	99.68	100.00	99.80	99.81	100.01
ATOMIC PROPORTIONS ON THE BASIS OF 8 OXYGENS										
SI	2.109	2.086	2.114	2.109	2.081	2.067	2.056	2.044	2.075	2.221
TI	0.002	0.001	0.000	0.001	0.001	0.002	0.001	0.000	0.001	0.001
AL	1.835	1.914	1.840	1.871	1.854	1.915	1.914	1.929	1.887	1.746
FE2	0.027	0.017	0.023	0.017	0.018	0.016	0.022	0.023	0.017	0.017
MG	0.009	0.003	0.009	0.007	0.008	0.005	0.006	0.001	0.001	0.005
CA	0.923	0.898	0.818	0.893	0.975	0.933	0.946	0.952	0.951	0.798
K	0.005	0.001	0.001	0.001	0.000	0.001	0.003	0.002	0.002	0.003
NA	0.125	0.074	0.322	0.108	0.108	0.067	0.075	0.078	0.093	0.229
END MEMBER COMPOSITIONS										
AB	11.86	7.56	28.24	10.73	9.94	6.65	7.29	7.52	8.88	22.22
AN	87.69	92.38	71.71	89.15	90.06	93.23	92.42	92.25	90.95	77.49
OR	0.45	0.06	0.05	0.12	0.00	0.12	0.29	0.23	0.17	0.28

LESSER ANTILLES PLUTONICS - LIST 1 - PLAGIOCLASES

	91	92	93	94	95	96	97	98	99	100
	464D18P3	465D18P4	459D20P1	460D20P2	461D20P3	466D21P1	467D21P2	468D21P3	442M1P1	443M1P2
OXIDE WEIGHT PERCENTAGE										
SIO2	43.93	47.26	43.91	43.79	49.67	44.49	44.80	44.39	47.99	47.78
TIO2	0.06	0.03	0.05	0.03	0.06	0.04	0.02	0.04	0.02	0.03
AL2O3	34.77	32.72	35.42	35.31	31.22	34.39	34.53	34.70	33.07	32.57
FEO	0.48	0.55	0.35	0.35	0.46	0.55	0.51	0.55	0.32	0.31
MGO	0.02	0.04	0.08	0.08	0.06	0.05	0.03	0.06	0.07	0.04
CAO	19.07	16.42	19.37	19.35	14.67	18.58	18.62	18.86	16.57	16.45
K2O	0.01	0.01	0.02	0.04	0.06	0.01	0.01	0.02	0.07	0.08
NA2O	1.00	2.45	0.55	0.52	3.14	1.09	0.99	0.88	2.46	2.53
TOTAL	99.34	99.48	99.75	99.47	99.34	99.20	99.51	99.50	100.57	99.79
ATOMIC PROPORTIONS ON THE BASIS OF 8 OXYGENS										
SI	2.052	2.186	2.039	2.040	2.285	2.077	2.083	2.067	2.193	2.201
TI	0.002	0.001	0.002	0.001	0.002	0.001	0.001	0.001	0.001	0.001
AL	1.915	1.785	1.939	1.939	1.693	1.893	1.892	1.905	1.782	1.769
FE2	0.019	0.021	0.014	0.014	0.018	0.021	0.020	0.021	0.012	0.012
MG	0.001	0.003	0.006	0.006	0.004	0.003	0.002	0.004	0.005	0.003
CA	0.954	0.814	0.964	0.966	0.723	0.929	0.928	0.941	0.811	0.812
K	0.001	0.001	0.001	0.002	0.004	0.001	0.001	0.001	0.004	0.005
NA	0.091	0.220	0.050	0.047	0.280	0.099	0.089	0.079	0.218	0.226
END MEMBER COMPOSITIONS										
AB	8.66	21.25	4.88	4.63	27.83	9.59	8.77	7.78	21.10	21.68
AN	91.28	78.69	95.00	95.14	71.82	90.35	91.17	92.10	78.51	77.87
OR	0.06	0.06	0.12	0.23	0.35	0.06	0.06	0.12	0.39	0.45

LESSER ANTILLES PLUTONICS - LIST 1 - PLAGIOCLASES

	101	102	103	104	105	106	107	108	109	110
	444M1P3	445M2P1	446M2P2	447M2P3	429L1P1	430L1P2	432L1P3	418L2P1	419L2P2	420L2P3
OXIDE WEIGHT PERCENTAGE										
SIO2	49.67	44.37	45.15	56.63	48.02	45.34	55.48	43.93	43.94	44.42
TIO2	0.03	0.03	0.06	0.03	0.04	0.01	0.04	0.05	0.04	0.04
AL2O3	30.81	34.94	34.57	26.72	32.33	35.03	27.41	35.99	35.98	35.78
FEO	0.37	0.45	0.34	0.28	0.15	0.04	0.19	0.53	0.53	0.54
MGO	0.06	-	0.06	0.02	0.04	0.04	0.01	0.11	0.05	0.04
CAO	14.36	19.06	18.89	9.00	15.73	18.26	10.59	19.58	19.48	19.28
K2O	0.13	0.04	0.06	0.38	0.08	0.05	0.18	0.03	0.02	0.03
NA2O	4.34	0.60	0.83	6.43	3.17	1.08	5.77	0.60	0.47	0.50
TOTAL	99.77	99.49	99.96	99.49	99.56	99.85	99.67	100.82	100.51	100.63
ATOMIC PROPORTIONS ON THE BASIS OF 8 OXYGENS										
SI	2.284	2.064	2.088	2.560	2.215	2.092	2.511	2.022	2.027	2.044
TI	0.001	0.001	0.002	0.001	0.001	0.000	0.001	0.002	0.001	0.001
AL	1.670	1.916	1.885	1.424	1.758	1.905	1.463	1.953	1.957	1.941
FE2	0.014	0.018	0.013	0.011	0.006	0.002	0.007	0.020	0.020	0.021
MG	0.004	0.000	0.004	0.001	0.003	0.003	0.001	0.008	0.003	0.003
CA	0.708	0.950	0.936	0.436	0.777	0.903	0.514	0.966	0.963	0.951
K	0.008	0.002	0.004	0.022	0.005	0.003	0.010	0.002	0.001	0.002
NA	0.387	0.054	0.074	0.564	0.284	0.097	0.507	0.054	0.042	0.045
END MEMBER COMPOSITIONS										
AB	35.12	5.38	7.34	55.18	26.61	9.64	49.15	5.25	4.18	4.48
AN	64.19	94.39	92.31	42.67	72.95	90.06	49.84	94.58	95.70	95.35
OR	0.69	0.24	0.35	2.15	0.44	0.29	1.01	0.17	0.12	0.18

LESSER ANTILLES PLUTONICS - LIST 1 - PLAGIOCLASES

	111	112	113	114	115	116	117	118	119	120
	433L4P1	434L4P2	435L4P3	424L6P1	425L6P2	426L6P3	427L9P1	428L9P2	421L10P1	422L10P2
OXIDE WEIGHT PERCENTAGE										
SIO2	44.92	44.79	44.76	51.78	56.19	53.24	45.06	43.98	44.55	44.66
TIO2	0.02	0.05	-	0.07	0.04	0.03	0.04	0.07	0.04	0.01
AL2O3	34.93	34.83	35.31	30.47	27.46	28.99	34.66	35.94	35.61	35.49
FEO	0.38	0.39	0.29	0.22	0.43	0.23	0.73	0.49	0.58	0.57
MGO	-	0.04	0.05	0.04	0.03	0.05	0.08	0.08	0.09	0.04
CAO	19.03	18.83	18.65	12.81	9.63	11.89	18.12	19.35	18.75	18.79
K2O	0.03	0.02	0.04	0.22	0.37	0.26	0.05	0.05	0.03	0.03
NA2O	0.86	0.81	0.95	4.16	5.68	4.82	1.12	0.52	0.68	0.75
TOTAL	100.17	99.76	100.05	99.77	99.83	99.51	99.86	100.48	100.33	100.34
ATOMIC PROPORTIONS ON THE BASIS OF 8 OXYGENS										
SI	2.075	2.076	2.067	2.357	2.533	2.425	2.087	2.029	2.054	2.059
TI	0.001	0.002	0.000	0.002	0.001	0.001	0.001	0.002	0.001	0.000
AL	1.902	1.903	1.923	1.636	1.459	1.557	1.892	1.955	1.935	1.929
FE2	0.015	0.015	0.011	0.008	0.016	0.009	0.028	0.019	0.022	0.022
MG	0.000	0.003	0.003	0.003	0.002	0.003	0.006	0.005	0.006	0.003
CA	0.942	0.935	0.923	0.625	0.465	0.583	0.899	0.956	0.926	0.928
K	0.002	0.001	0.002	0.013	0.021	0.015	0.003	0.003	0.002	0.002
NA	0.077	0.073	0.085	0.367	0.497	0.426	0.101	0.047	0.061	0.067
END MEMBER COMPOSITIONS										
AB	7.55	7.22	8.42	36.55	50.52	41.70	10.03	4.63	6.15	6.73
AN	92.28	92.67	91.34	62.18	47.32	56.82	89.67	95.08	93.67	93.10
OR	0.17	0.12	0.23	1.27	2.16	1.48	0.29	0.29	0.18	0.18

LESSER ANTILLES PLUTONICS - LIST 1 - PLAGIOCLASES

	121	122	123	124	125	126	127	128	129	130
	423L10P3	439V1P1	440V1P2	441V1P3	246V2P1	IMV1P1	IMV2P1	IMV3P1	JLV740P1	JLV770P1
OXIDE WEIGHT PERCENTAGE										
SIO2	44.57	44.57	44.99	44.17	43.08	43.90	44.10	43.60	45.13	44.88
TIO2	0.04	0.07	0.03	0.05	0.03	-	-	-	N D	N D
AL2O3	35.52	34.54	34.78	35.23	35.82	35.50	35.40	35.20	34.92	35.24
FEO	0.58	0.46	0.33	0.57	0.46	0.44	0.45	0.44	0.31	0.30
MGO	0.09	0.07	0.07	0.10	0.01	TR.	TR.	TR.	N D	N D
CAO	18.68	18.74	19.34	18.98	20.72	19.30	19.10	18.90	19.40	19.15
K2O	0.04	0.03	0.03	0.03	N D	0.02	TR.	0.03	-	0.01
NA2O	0.73	0.88	0.82	0.62	0.23	0.50	0.79	0.61	0.57	0.67
TOTAL	100.25	99.36	100.39	99.75	100.35	99.66	99.84	98.78	100.33	100.25
ATOMIC PROPORTIONS ON THE BASIS OF 8 OXYGENS										
SI	2.056	2.076	2.075	2.051	1.999	2.040	2.046	2.043	2.079	2.069
TI	0.001	0.002	0.001	0.002	0.001	0.000	0.000	0.000	0.000	0.000
AL	1.932	1.896	1.891	1.928	1.960	1.945	1.936	1.945	1.897	1.916
FE2	0.022	0.018	0.013	0.022	0.018	0.017	0.017	0.017	0.012	0.012
MG	0.006	0.005	0.005	0.007	0.001	0.000	0.000	0.000	0.000	0.000
CA	0.924	0.935	0.956	0.944	1.030	0.961	0.950	0.949	0.958	0.946
K	0.002	0.002	0.002	0.002	0.000	0.001	0.000	0.002	0.000	0.001
NA	0.065	0.079	0.073	0.056	0.021	0.045	0.071	0.055	0.051	0.060
END MEMBER COMPOSITIONS										
AB	6.59	7.82	7.12	5.57	1.97	4.47	6.97	5.51	5.05	5.95
AN	93.17	92.00	92.71	94.25	98.03	95.41	93.03	94.31	94.95	93.99
OR	0.24	0.18	0.17	0.18	0.00	0.12	0.00	0.18	0.00	0.06

LESSER ANTILLES PLUTONICS - LIST 1 - PLAGIOCLASES

	131	132	133	134	135	136	137	138	139	140
	JLV774P1	413B1P1	414B1P2	415C1P1	416C1P2	417C1P3	411C2P1	412C2P2	407C3P1	408C3P2
OXIDE WEIGHT PERCENTAGE										
SIO2	44.69	44.60	45.34	45.19	44.37	44.45	46.71	46.48	44.71	45.20
TIO2	N.D	0.02	0.03	0.04	0.06	0.03	0.04	0.04	0.05	0.05
AL2O3	35.91	34.67	34.53	34.58	34.66	34.68	33.62	33.26	34.47	33.86
FEO	0.31	0.21	0.25	0.52	0.61	0.50	0.55	0.52	0.53	0.63
MGO	N.D	-	0.13	0.06	0.04	0.07	-	0.06	0.09	0.06
CAO	18.54	18.99	18.68	18.41	18.85	18.82	17.66	17.59	18.83	18.53
K2O	0.02	-	0.01	0.01	-	0.01	0.01	0.01	0.02	0.03
NA2O	0.80	0.83	1.07	1.07	0.86	0.99	1.59	1.65	0.96	1.01
TOTAL	100.27	99.32	100.04	99.88	99.45	99.55	100.18	99.61	99.66	99.37
ATOMIC PROPORTIONS ON THE BASIS OF 8 OXYGENS										
SI	2.057	2.076	2.093	2.091	2.067	2.068	2.149	2.151	2.078	2.104
TI	0.000	0.001	0.001	0.001	0.002	0.001	0.001	0.001	0.002	0.002
AL	1.949	1.902	1.880	1.886	1.904	1.902	1.824	1.815	1.888	1.859
FE2	0.012	0.008	0.010	0.020	0.024	0.019	0.021	0.020	0.021	0.025
MG	0.000	0.000	0.009	0.004	0.003	0.005	0.000	0.004	0.006	0.004
CA	0.914	0.947	0.924	0.913	0.941	0.938	0.871	0.873	0.938	0.924
K	0.001	0.000	0.001	0.001	0.000	0.001	0.001	0.001	0.001	0.002
NA	0.071	0.075	0.096	0.096	0.078	0.089	0.142	0.148	0.087	0.091
END MEMBER COMPOSITIONS										
AB	7.24	7.33	9.39	9.51	7.63	8.69	14.01	14.51	8.44	8.96
AN	92.64	92.67	90.55	90.43	92.37	91.25	85.94	85.44	91.45	90.86
OR	0.12	0.00	0.06	0.06	0.00	0.06	0.06	0.06	0.12	0.18

LESSER ANTILLES PLUTONICS - LIST 1 - PLAGIOCLASES

	141	142	143	144	145	146	147	148	149	150
	409C3P3	410C3P4	398X1P1	399X1P2	400X1P3	401X2P1	402X2P2	403X2P3	404X3P1	405X3P2
OXIDE WEIGHT PERCENTAGE										
SIO2	44.99	44.92	44.01	44.04	44.87	45.41	44.71	44.98	45.88	45.71
TIO2	0.04	0.03	0.03	0.05	0.03	0.03	0.05	0.05	0.03	0.04
AL2O3	34.40	34.42	34.77	34.94	34.75	33.38	34.36	34.07	33.65	34.09
FEO	0.63	0.44	0.45	0.56	0.48	0.57	0.52	0.50	0.49	0.49
MGO	0.03	0.04	0.05	0.11	0.05	0.07	0.04	0.08	0.07	0.05
CAO	18.69	18.83	19.51	19.23	19.08	18.35	19.08	18.79	17.86	18.05
K2O	0.01	0.01	0.03	0.03	0.01	0.01	0.01	0.01	0.04	0.04
NA2O	0.84	0.96	0.61	0.61	0.92	1.33	0.83	1.05	1.34	1.11
TOTAL	99.63	99.65	99.46	99.57	100.19	99.15	99.60	99.53	99.36	99.58
ATOMIC PROPORTIONS ON THE BASIS OF 8 OXYGENS										
SI	2.089	2.085	2.052	2.051	2.074	2.119	2.079	2.092	2.130	2.117
TI	0.001	0.001	0.001	0.002	0.001	0.001	0.002	0.002	0.001	0.001
AL	1.883	1.884	1.912	1.918	1.894	1.836	1.884	1.868	1.842	1.862
FE2	0.024	0.017	0.018	0.022	0.019	0.022	0.020	0.019	0.019	0.019
MG	0.002	0.003	0.003	0.008	0.003	0.005	0.003	0.006	0.005	0.003
CA	0.930	0.937	0.975	0.960	0.945	0.918	0.951	0.937	0.889	0.896
K	0.001	0.001	0.002	0.002	0.001	0.001	0.001	0.001	0.002	0.002
NA	0.076	0.086	0.055	0.055	0.082	0.120	0.075	0.095	0.121	0.100
END MEMBER COMPOSITIONS										
AB	7.52	8.44	5.35	5.42	8.02	11.59	7.30	9.18	11.93	9.99
AN	92.42	91.50	94.48	94.40	91.92	88.35	92.65	90.76	87.84	89.77
OR	0.06	0.06	0.17	0.18	0.06	0.06	0.06	0.06	0.23	0.24

LESSER ANTILLES PLUTONICS - LIST 2A - AMPHIBOLES (ALL FE AS FEO)

	1	2	3	4	5	6	7	8	9	10
	22A1A1	23A1A2	28E2A1	29E2A2	30E2A3	26E3A1	27E3A2	19E4A1	20E4A2	21E4A3
OXIDE WEIGHT PERCENTAGE										
SIO2	43.55	45.19	42.11	42.25	43.86	41.58	41.25	40.39	40.16	40.75
TIO2	1.92	1.78	2.50	2.73	1.93	2.25	2.18	2.17	2.12	2.10
AL2O3	11.57	9.16	12.78	12.76	12.12	13.02	13.00	14.66	15.24	14.53
FEO	15.14	14.17	10.96	12.34	12.50	11.92	12.01	10.47	10.20	10.51
MNO	0.52	0.46	0.17	0.26	0.23	0.22	0.13	0.13	0.14	0.12
MGO	12.02	13.60	15.20	14.63	14.51	13.77	14.50	14.89	15.24	14.53
CAO	10.99	10.82	11.68	10.76	11.35	11.94	12.06	12.46	12.36	12.10
K2O	0.42	0.39	0.16	0.11	0.15	0.18	0.17	0.27	0.24	0.06
NA2O	1.70	1.97	2.70	2.78	2.78	2.50	2.77	2.45	2.34	2.36
TOTAL	97.83	97.54	98.26	98.62	99.43	97.38	98.07	97.89	98.04	97.06
ATOMIC PROPORTIONS ON THE BASIS OF 23 OXYGENS										
SI	6.454	6.682	6.137	6.156	6.332	6.146	6.071	5.919	5.864	5.999
TI	0.214	0.198	0.274	0.299	0.210	0.250	0.241	0.239	0.233	0.233
AL	2.022	1.597	2.196	2.192	2.063	2.269	2.256	2.533	2.624	2.522
FE2	1.877	1.752	1.336	1.504	1.509	1.474	1.478	1.283	1.246	1.294
MN	0.065	0.058	0.021	0.032	0.028	0.028	0.016	0.016	0.017	0.015
MG	2.655	2.997	3.302	3.177	3.122	3.033	3.180	3.252	3.316	3.188
CA	1.746	1.714	1.824	1.680	1.756	1.891	1.902	1.957	1.934	1.909
K	0.079	0.074	0.030	0.020	0.028	0.034	0.032	0.050	0.045	0.011
NA	0.489	0.565	0.763	0.786	0.779	0.717	0.791	0.696	0.663	0.674
END MEMBER COMPOSITIONS										
CA	27.52	26.29	28.14	26.28	27.37	29.43	28.92	30.07	29.69	29.80
MG	41.86	45.95	50.93	49.69	48.66	47.21	48.36	49.97	50.92	49.76
FE	30.62	27.76	20.93	24.03	23.97	23.36	22.72	19.97	19.39	20.44

LESSER ANTILLES PLUTONICS - LIST 2A - AMPHIBOLES (ALL FE AS FEO)

	11	12	13	14	15	16	17	18	19	20
	93K1A1	94K1A2	95K2A1	96K2A2	97K3A1	98K3A2	99K5A1	100K5A2	101K7A1	102K7A2
OXIDE WEIGHT PERCENTAGE										
SIO2	42.87	41.61	45.90	46.50	44.86	43.96	44.44	44.18	41.10	41.16
TIO2	2.09	2.22	1.93	1.91	2.77	2.77	2.47	2.68	2.10	1.96
AL2O3	12.68	13.32	10.44	8.59	9.92	9.95	9.50	9.45	14.08	14.06
FEO	12.12	11.76	13.67	13.94	14.18	13.86	15.36	14.78	11.68	12.33
MNO	0.21	0.13	0.27	0.25	0.21	0.28	0.28	0.30	0.09	0.09
MGO	14.01	14.42	12.31	13.48	13.52	13.31	13.35	13.01	14.56	13.56
CAO	11.77	11.70	11.47	10.78	10.83	11.19	10.38	10.63	12.32	12.04
K2O	0.12	0.14	0.25	0.25	0.19	0.19	0.23	0.22	0.20	0.20
NA2O	2.55	2.67	1.97	2.05	2.11	3.13	2.54	2.47	2.28	2.38
TOTAL	98.42	97.94	98.21	97.75	98.59	98.64	98.55	97.72	98.41	97.78
ATOMIC PROPORTIONS ON THE BASIS OF 23 OXYGENS										
SI	6.253	6.105	6.700	6.823	6.554	6.459	6.546	6.553	6.007	6.065
TI	0.229	0.245	0.212	0.211	0.304	0.306	0.274	0.299	0.231	0.217
AL	2.181	2.304	1.797	1.486	1.709	1.724	1.650	1.653	2.426	2.443
FE2	1.479	1.443	1.669	1.711	1.733	1.703	1.892	1.834	1.428	1.520
MN	0.026	0.012	0.033	0.031	0.026	0.035	0.035	0.038	0.011	0.011
MG	3.045	3.153	2.678	2.948	2.944	2.915	2.931	2.876	3.171	2.978
CA	1.840	1.840	1.794	1.695	1.696	1.762	1.639	1.690	1.930	1.901
K	0.022	0.026	0.047	0.047	0.035	0.036	0.043	0.042	0.037	0.038
NA	0.721	0.760	0.558	0.583	0.598	0.892	0.726	0.711	0.646	0.680
END MEMBER COMPOSITIONS										
CA	28.79	28.53	29.06	26.55	26.50	27.47	25.22	26.25	29.50	29.66
MG	47.66	48.90	43.37	46.17	46.01	45.44	45.11	44.68	48.49	46.46
FE	23.55	22.57	27.57	27.28	27.49	27.10	29.67	29.07	22.00	23.88

LESSER ANTILLES PLUTONICS - LIST 2A - AMPHIBOLES (ALL FE AS FEO)

	21	22	23	24	25	26	27	28	29	30
	103K7A3	104K10A1	105K10A2	106K11A1	107K11A2	108K11A3	357K12A1	358K12A2	IMK1A1	109F1A1
OXIDE WEIGHT PERCENTAGE										
SIO2	41.07	43.14	43.57	42.98	43.21	42.15	41.36	41.86	40.80	40.71
TIO2	2.11	2.83	3.06	1.76	1.83	1.63	2.20	2.02	1.99	1.91
AL203	14.03	10.32	11.50	12.17	12.17	13.92	15.14	15.34	15.50	14.01
FEO	11.87	16.72	15.67	13.49	12.80	13.16	10.19	9.54	9.36	11.53
MNO	0.10	0.24	0.20	0.25	0.21	0.18	0.10	0.09	0.11	0.13
MGO	14.51	11.33	11.10	13.74	13.74	12.30	14.71	15.56	14.60	13.98
CAO	12.16	11.16	11.01	11.45	11.70	12.09	12.58	12.36	13.10	12.34
K20	0.21	0.26	0.29	0.11	0.09	0.08	0.23	0.20	0.20	0.22
NA20	2.38	2.93	2.93	2.15	2.40	2.58	2.22	2.21	2.24	2.82
TOTAL	98.44	98.93	99.33	98.10	98.15	98.09	98.73	99.18	97.90	97.65
ATOMIC PROPORTIONS ON THE BASIS OF 23 OXYGENS										
SI	6.007	6.407	6.393	6.314	6.330	6.199	5.978	5.992	5.937	6.010
TI	0.232	0.316	0.338	0.194	0.202	0.180	0.239	0.217	0.218	0.212
AL	2.419	1.807	1.989	2.108	2.102	2.414	2.580	2.589	2.659	2.439
FE2	1.452	2.077	1.923	1.658	1.568	1.619	1.232	1.142	1.139	1.424
MN	0.012	0.030	0.025	0.031	0.026	0.022	0.012	0.011	0.014	0.016
MG	3.163	2.508	2.427	3.008	3.000	2.696	3.168	3.320	3.166	3.076
CA	1.906	1.776	1.731	1.803	1.837	1.905	1.948	1.896	2.043	1.952
K	0.039	0.049	0.054	0.021	0.017	0.015	0.042	0.037	0.037	0.041
NA	0.675	0.844	0.834	0.613	0.682	0.736	0.622	0.614	0.632	0.808
END MEMBER COMPOSITIONS										
CA	29.17	27.79	28.35	27.73	28.56	30.52	30.63	29.77	32.11	30.18
MG	48.41	39.24	39.75	46.28	46.65	43.19	49.81	52.12	49.77	47.55
FE	22.42	32.97	31.90	25.98	24.79	26.29	19.56	18.11	18.12	22.26

LESSER ANTILLES PLUTONICS - LIST 2A - AMPHIBOLES (ALL FE AS FEO)

	31	32	33	34	35	36	37	38	39	40
	113F1A2	111F1A3	359F2A1	360F2A2	JRF47CA1	JRF47DA1	IMF1A1	IMF2A1	IMF3A1	2404A1
OXIDE WEIGHT PERCENTAGE										
SIO2	41.10	40.08	41.42	42.59	40.39	40.68	40.50	39.30	41.20	41.94
TIO2	1.87	1.94	1.60	1.45	1.80	1.63	2.03	1.93	1.95	2.91
AL2O3	14.37	14.43	14.07	13.17	14.88	14.64	15.40	13.90	14.60	13.67
FEO	10.86	11.26	11.16	11.44	10.04	11.36	13.30	15.30	13.60	11.34
MNO	0.15	0.14	0.14	0.24	0.14	0.15	0.16	0.20	0.16	0.24
MGO	14.26	14.63	14.39	14.90	16.26	15.83	13.80	13.30	14.10	14.20
CAO	12.18	12.19	11.94	11.49	11.80	11.76	12.20	11.40	12.30	11.69
K2O	0.28	0.26	0.24	0.22	2.39	2.48	0.21	0.24	0.21	0.34
NA2O	2.59	3.05	2.32	2.24	0.22	0.20	2.00	1.91	2.15	2.22
TOTAL	97.66	97.98	97.28	97.74	97.92	98.73	99.60	97.48	100.27	98.55
ATOMIC PROPORTIONS ON THE BASIS OF 23 OXYGENS										
SI	6.034	5.904	6.097	6.228	5.918	5.947	5.885	5.903	5.956	6.097
TI	0.207	0.215	0.177	0.159	0.198	0.179	0.222	0.218	0.212	0.318
AL	2.487	2.506	2.442	2.271	2.571	2.523	2.638	2.462	2.488	2.343
FE2	1.334	1.387	1.374	1.399	1.231	1.389	1.616	1.922	1.644	1.379
MN	0.019	0.017	0.017	0.030	0.017	0.019	0.020	0.025	0.020	0.030
MG	3.120	3.212	3.157	3.247	3.551	3.449	2.988	2.977	3.038	3.077
CA	1.916	1.924	1.883	1.801	1.853	1.842	1.900	1.835	1.906	1.821
K	0.052	0.049	0.045	0.041	0.447	0.463	0.039	0.046	0.039	0.063
NA	0.738	0.871	0.662	0.635	0.063	0.057	0.564	0.557	0.603	0.626
END MEMBER COMPOSITIONS										
CA	30.00	29.42	29.28	27.80	27.86	27.50	29.12	27.15	28.84	28.88
MG	48.84	49.10	49.08	50.14	53.38	51.48	45.80	44.04	45.98	48.79
FE	21.17	21.48	21.63	22.06	18.76	21.01	25.08	28.81	25.18	22.33

LESSER ANTILLES PLUTONICS - LIST 2A - AMPHIBOLES (ALL FE AS FEO)

	41	42	43	44	45	46	47	48	49	50
	25D4A2	353D6A1	354D6A2	390D17A1	391D17A2	392D18A1	393D18A2	355D20A1	356D20A2	394D21A1
OXIDE WEIGHT PERCENTAGE										
SIO2	41.89	43.24	46.14	42.80	42.44	43.08	43.20	40.48	40.22	42.33
TIO2	2.65	1.89	1.68	1.89	2.34	2.54	2.69	1.77	1.73	2.46
AL2O3	13.21	11.54	8.34	11.54	11.66	11.13	10.95	15.55	16.18	11.56
FEO	11.27	17.86	17.16	11.46	11.87	13.18	12.84	8.83	8.91	12.43
MNO	0.21	0.50	0.35	0.17	0.20	0.30	0.28	0.09	0.13	0.19
MGO	14.02	10.89	11.20	14.50	14.65	12.94	13.53	15.14	15.14	14.19
CAO	11.79	11.01	10.81	11.64	11.84	11.36	11.31	12.60	12.59	11.40
K2O	0.32	0.29	0.34	0.40	0.32	0.26	0.23	0.38	0.39	0.33
NA2O	2.33	1.90	1.20	2.40	2.39	2.62	2.61	2.25	2.46	2.30
TOTAL	97.69	98.92	97.22	96.80	97.71	97.41	97.64	97.09	97.75	97.19
ATOMIC PROPORTIONS ON THE BASIS OF 23 OXYGENS										
SI	6.146	6.421	6.896	6.340	6.250	6.387	6.378	5.926	5.857	6.273
TI	0.292	0.189	0.189	0.211	0.259	0.283	0.299	0.195	0.190	0.274
AL	2.285	2.021	1.470	2.015	2.024	1.946	1.906	2.684	2.778	2.020
FE2	1.383	2.218	2.145	1.420	1.462	1.634	1.586	1.081	1.085	1.541
MN	0.026	0.063	0.044	0.021	0.025	0.038	0.035	0.011	0.016	0.024
MG	3.066	2.410	2.495	3.201	3.215	2.859	2.977	3.303	3.286	3.134
CA	1.854	1.752	1.731	1.848	1.868	1.805	1.790	1.977	1.965	1.811
K	0.060	0.055	0.065	0.076	0.060	0.049	0.043	0.071	0.072	0.062
NA	0.663	0.547	0.348	0.690	0.683	0.754	0.748	0.639	0.695	0.661
END MEMBER COMPOSITIONS										
CA	29.29	27.19	26.99	28.47	28.44	28.49	28.02	31.02	30.93	27.81
MG	48.44	37.40	38.89	49.32	48.93	45.12	46.61	51.84	51.73	48.15
FE	22.27	35.40	34.13	22.21	22.63	26.39	25.37	17.14	17.34	24.04

LESSER ANTILLES PLUTONICS - LIST 2A - AMPHIBOLES (ALL FE AS FEO)

	51	52	53	54	55	56	57	58	59	60
	395D21A2	386M1A1	387M1A2	388M2A1	389M2A2	396L1A1	397L1A2	381L2A1	382L2A2	363L4A1
OXIDE WEIGHT PERCENTAGE										
SIO2	43.07	46.51	46.47	48.12	47.87	44.08	43.77	40.10	40.06	44.73
TIO2	2.16	1.76	1.98	1.46	1.58	2.34	1.99	2.18	2.22	1.23
AL2O3	11.10	7.93	7.95	6.37	6.92	12.30	13.71	14.94	14.41	11.42
FEO	12.14	12.62	12.83	13.86	13.55	9.81	11.00	10.89	10.73	13.25
MNO	0.24	0.25	0.25	0.32	0.53	0.16	0.15	0.14	0.16	0.41
MGO	14.41	14.35	14.26	14.24	14.47	15.28	14.80	14.35	14.17	13.48
CAO	11.42	11.25	11.31	11.23	11.66	11.40	11.48	12.27	12.26	10.87
K2O	0.31	0.31	0.26	0.13	0.23	0.38	0.40	0.16	0.25	0.16
NA2O	2.49	2.08	2.60	1.46	1.43	2.20	1.86	2.59	2.47	1.71
TOTAL	97.34	97.06	97.91	97.19	98.24	97.95	99.16	97.62	96.73	97.26
ATOMIC PROPORTIONS ON THE BASIS OF 23 OXYGENS										
SI	6.361	6.851	6.807	7.078	6.979	6.370	6.270	5.901	5.949	6.575
TI	0.240	0.195	0.218	0.162	0.173	0.254	0.214	0.241	0.248	0.136
AL	1.933	1.377	1.373	1.105	1.189	2.096	2.316	2.592	2.523	1.979
FE2	1.500	1.555	1.572	1.705	1.652	1.186	1.318	1.340	1.333	1.629
MN	0.030	0.031	0.031	0.040	0.065	0.020	0.018	0.017	0.020	0.051
MG	3.172	3.150	3.113	3.122	3.144	3.291	3.160	3.147	3.136	2.953
CA	1.807	1.776	1.775	1.770	1.822	1.765	1.762	1.935	1.951	1.712
K	0.058	0.058	0.049	0.024	0.043	0.070	0.073	0.030	0.047	0.030
NA	0.713	0.594	0.739	0.417	0.404	0.617	0.517	0.739	0.711	0.488
END MEMBER COMPOSITIONS										
CA	27.77	27.27	27.35	26.67	27.26	28.19	28.16	30.05	30.30	26.98
MG	48.73	48.37	47.96	47.03	47.04	52.56	50.49	48.87	48.70	46.54
FE	23.50	24.36	24.69	26.29	25.70	19.25	21.35	21.08	21.01	26.48

LESSER ANTILLES PLUTONICS - LIST 2A - AMPHIBOLES (ALL FE AS FEO)

	61	62	63	64	65	66	67	68	69	70
	364L4A2	383L6A1	384L6A2	385L6A3	361L10A1	362L10A2	377V1A1	378V1A2	JLV736A1	JLV770A1
OXIDE WEIGHT PERCENTAGE										
SIO2	45.74	45.43	42.70	42.50	41.33	41.11	41.56	41.00	40.96	41.21
TIO2	1.23	1.35	1.89	2.06	2.59	2.35	2.58	2.51	2.34	2.07
AL2O3	10.89	8.04	9.94	9.95	13.79	13.48	13.07	13.44	13.89	14.01
FEO	13.38	20.56	20.31	22.53	11.36	11.30	10.93	10.75	11.52	10.02
MNO	0.39	0.37	0.38	0.42	0.15	0.18	0.16	0.16	0.12	0.09
MGO	13.58	9.70	8.62	7.83	14.34	13.90	14.64	14.62	14.63	15.26
CAO	10.95	9.80	10.78	9.85	11.85	12.13	12.01	11.84	11.63	11.58
K2O	0.15	0.44	1.22	0.68	0.23	0.26	0.21	0.22	0.28	0.27
NA2O	1.80	1.46	1.45	1.59	2.54	2.50	2.67	2.76	2.43	2.43
TOTAL	98.11	97.15	97.29	97.41	98.18	97.21	97.83	97.30	97.80	96.94
ATOMIC PROPORTIONS ON THE BASIS OF 23 OXYGENS										
SI	6.660	6.908	6.559	6.555	6.044	6.079	6.095	6.045	6.017	6.057
TI	0.135	0.154	0.218	0.239	0.285	0.261	0.285	0.278	0.259	0.229
AL	1.870	1.441	1.800	1.809	2.378	2.350	2.260	2.336	2.406	2.428
FE2	1.630	2.614	2.609	2.907	1.390	1.398	1.341	1.326	1.415	1.232
MN	0.048	0.048	0.049	0.055	0.019	0.023	0.020	0.020	0.015	0.011
MG	2.947	2.198	1.973	1.800	3.125	3.064	3.200	3.213	3.203	3.343
CA	1.709	1.596	1.774	1.628	1.857	1.922	1.888	1.871	1.831	1.824
K	0.028	0.085	0.239	0.134	0.043	0.049	0.039	0.041	0.052	0.051
NA	0.508	0.431	0.432	0.476	0.721	0.717	0.760	0.789	0.692	0.693
END MEMBER COMPOSITIONS										
CA	26.98	24.73	27.70	25.48	29.06	30.01	29.27	29.10	28.32	28.46
MG	46.53	34.04	30.80	28.17	48.91	47.82	49.63	49.97	49.55	52.15
FE	26.49	41.23	41.50	46.35	22.03	22.17	21.10	20.93	22.13	19.39

LESSER ANTILLES PLUTONICS - LIST 2A - AMPHIBOLES (ALL FE AS FEO)

	71	72	73	74	75	76	77	78	79	80
	JLV774A1	JLV896A1	379B1A1	380B1A2	365C1A1	366C1A2	367C2A1	368C2A2	375C3A1	376C3A2
OXIDE WEIGHT PERCENTAGE										
SIO2	41.04	40.88	41.81	41.63	41.32	41.32	43.04	43.08	41.67	41.61
TIO2	1.87	2.54	3.22	3.26	1.94	1.99	1.81	2.12	2.06	1.84
AL2O3	13.87	14.23	13.13	13.92	13.97	13.67	12.57	12.26	13.03	13.89
FEO	11.58	11.33	12.32	11.91	11.78	11.94	11.85	11.97	12.20	11.54
MNO	0.15	0.09	0.23	0.20	0.19	0.17	0.27	0.27	0.21	0.19
MGO	14.24	14.74	12.70	13.14	13.93	13.82	14.27	14.33	14.14	13.90
CAO	11.54	11.59	11.77	12.01	12.13	12.14	11.73	11.54	11.79	12.02
K2O	0.30	0.28	0.42	0.45	0.31	0.30	0.26	0.29	0.31	0.32
NA2O	2.41	2.45	2.62	2.51	2.56	2.31	2.35	2.57	2.57	2.43
TOTAL	97.00	98.13	98.22	99.03	98.13	97.66	98.15	98.43	97.98	97.74
ATOMIC PROPORTIONS ON THE BASIS OF 23 OXYGENS										
SI	6.075	5.979	6.142	6.056	6.063	6.092	6.286	6.283	6.132	6.113
TI	0.208	0.279	0.356	0.357	0.214	0.221	0.199	0.233	0.228	0.203
AL	2.421	2.454	2.274	2.387	2.417	2.375	2.164	2.108	2.261	2.406
FE2	1.434	1.386	1.514	1.449	1.446	1.472	1.448	1.460	1.502	1.418
MN	0.019	0.011	0.029	0.025	0.024	0.021	0.033	0.033	0.026	0.024
MG	3.141	3.213	2.781	2.849	3.046	3.037	3.106	3.115	3.101	3.044
CA	1.831	1.816	1.853	1.872	1.907	1.918	1.836	1.804	1.859	1.893
K	0.057	0.052	0.079	0.084	0.058	0.056	0.048	0.054	0.058	0.060
NA	0.692	0.695	0.747	0.708	0.729	0.661	0.666	0.727	0.734	0.693
END MEMBER COMPOSITIONS										
CA	28.49	28.27	30.00	30.22	29.70	29.75	28.58	28.13	28.66	29.67
MG	48.90	49.99	45.02	45.99	47.43	47.09	48.36	48.58	47.80	47.72
FE	22.61	21.74	24.98	23.79	22.88	23.16	23.06	23.29	23.55	22.61

LESSER ANTILLES PLUTONICS - LIST 2A - AMPHIBOLES (ALL FE AS FEO)

	81	82	83	84	85	86	87
	369X1A1	370X1A2	371X2A1	372X2A2	373X3A1	374X3A2	RAX245A1
OXIDE WEIGHT PERCENTAGE							
SIO2	42.08	41.37	42.28	41.57	40.86	40.85	42.78
TIO2	1.43	2.03	1.78	1.85	2.36	2.58	1.44
AL2O3	13.70	13.57	12.88	13.00	14.43	13.54	13.00
FEO	10.52	10.33	11.92	12.07	9.83	11.40	7.63
MNO	0.22	0.20	0.20	0.23	0.14	0.16	N.D
MGO	14.84	14.81	14.19	14.09	14.81	14.11	16.24
CAO	11.94	11.94	11.85	11.79	12.42	12.20	12.33
K2O	0.44	0.49	0.43	0.39	0.79	0.73	0.56
NA2O	2.25	2.51	2.37	2.32	2.36	2.30	2.43
TOTAL	97.42	97.25	97.90	97.31	98.00	97.87	96.41
ATOMIC PROPORTIONS ON THE BASIS OF 23 OXYGENS							
SI	6.167	6.090	6.210	6.154	5.973	6.022	6.257
TI	0.158	0.225	0.197	0.206	0.260	0.286	0.158
AL	2.367	2.355	2.230	2.269	2.487	2.353	2.242
FE2	1.290	1.272	1.464	1.495	1.202	1.406	0.933
MN	0.027	0.025	0.025	0.029	0.017	0.020	0.000
MG	3.242	3.249	3.106	3.109	3.227	3.100	3.540
CA	1.875	1.884	1.865	1.870	1.946	1.927	1.933
K	0.082	0.092	0.081	0.074	0.147	0.137	0.105
NA	0.640	0.717	0.675	0.666	0.669	0.658	0.689
END MEMBER COMPOSITIONS							
CA	29.15	29.30	28.87	28.77	30.44	29.87	30.17
MG	50.38	50.53	48.08	47.81	50.48	48.04	55.26
FE	20.47	20.17	23.05	23.43	19.08	22.09	14.57

LESSER ANTILLES PLUTONICS - LIST 28 - AMPHIBOLES (FE2O3/FEO=0.68)

	1	2	3	4	5	6	7	8	9	10
	22A1A1	23A1A2	28E2A1	29E2A2	30E2A3	26E3A1	27E3A2	19E4A1	20E4A2	21E4A3
OXIDE WEIGHT PERCENTAGE										
SIO2	43.55	45.19	42.11	42.25	43.86	41.58	41.25	40.39	40.16	40.75
TIO2	1.92	1.78	2.50	2.73	1.93	2.25	2.18	2.17	2.12	2.10
AL2O3	11.57	9.16	12.78	12.76	12.12	13.02	13.00	14.66	15.24	14.53
FE2O3	6.42	6.01	4.65	5.78	5.29	5.05	5.10	4.44	4.31	4.45
FEO	9.35	8.76	6.77	7.63	7.73	7.36	7.42	6.47	6.28	6.50
MNO	0.52	0.46	0.17	0.26	0.23	0.22	0.13	0.13	0.14	0.12
MGO	12.02	13.60	15.20	14.63	14.51	13.77	14.50	14.89	15.24	14.53
CAO	10.99	10.82	11.68	10.76	11.35	11.94	12.06	12.46	12.36	12.10
K2O	0.42	0.39	0.16	0.11	0.15	0.18	0.17	0.27	0.24	0.06
NA2O	1.70	1.97	2.70	2.78	2.78	2.50	2.77	2.45	2.34	2.36
TOTAL	98.46	98.14	98.72	99.69	99.95	97.87	98.58	98.33	98.43	97.50
ATOMIC PROPORTIONS ON THE BASIS OF 23 OXYGENS										
SI	6.356	6.586	6.070	6.057	6.254	6.072	5.997	5.856	5.805	5.936
TI	0.211	0.195	0.271	0.294	0.207	0.247	0.238	0.237	0.231	0.230
AL	1.991	1.574	2.172	2.157	2.038	2.242	2.228	2.506	2.597	2.495
FE3	0.705	0.659	0.504	0.624	0.568	0.555	0.558	0.485	0.469	0.488
FE2	1.141	1.068	0.816	0.915	0.922	0.899	0.902	0.785	0.759	0.792
MN	0.064	0.057	0.021	0.032	0.028	0.027	0.016	0.016	0.017	0.015
MG	2.614	2.954	3.265	3.126	3.084	2.997	3.142	3.218	3.283	3.154
CA	1.719	1.690	1.804	1.653	1.734	1.869	1.879	1.936	1.915	1.889
K	0.078	0.073	0.029	0.020	0.027	0.034	0.032	0.050	0.044	0.011
NA	0.481	0.557	0.755	0.773	0.769	0.708	0.781	0.689	0.656	0.667

LESSER ANTILLES PLUTONICS - LIST 2B - AMPHIBOLES (FE2O3/FEO=0.68)

	11	12	13	14	15	16	17	18	19	20
	93K1A1	94K1A2	95K2A1	96K2A2	97K3A1	98K3A2	99K5A1	100K5A2	101K7A1	102K7A2
OXIDE WEIGHT PERCENTAGE										
SIO2	42.87	41.61	45.90	46.50	44.86	43.96	44.44	44.18	41.10	41.16
TIO2	2.09	2.22	1.93	1.91	2.77	2.77	2.47	2.68	2.10	1.96
AL2O3	12.68	13.32	10.44	8.59	9.92	9.95	9.50	9.45	14.08	14.06
FE2O3	5.14	4.98	5.79	5.91	6.01	5.87	6.50	6.26	4.95	5.23
FEO	7.49	7.27	8.45	8.62	8.77	8.57	9.50	9.14	7.22	7.62
MNO	0.21	0.10	0.27	0.25	0.21	0.28	0.28	0.30	0.09	0.09
MGO	14.01	14.42	12.31	13.48	13.52	13.31	13.35	13.01	14.56	13.56
CAO	11.77	11.70	11.47	10.78	10.83	11.19	10.38	10.63	12.32	12.04
K2O	0.12	0.14	0.25	0.25	0.19	0.19	0.23	0.22	0.20	0.20
NA2O	2.55	2.67	1.97	2.05	2.11	3.13	2.54	2.47	2.28	2.28
TOTAL	98.93	98.43	98.78	98.34	99.19	99.22	99.19	98.34	98.90	98.20
ATOMIC PROPORTIONS ON THE BASIS OF 23 OXYGENS										
SI	6.177	6.033	6.609	6.727	6.461	6.370	6.446	6.455	5.937	5.993
TI	0.227	0.242	0.209	0.208	0.300	0.302	0.269	0.295	0.228	0.215
AL	2.154	2.277	1.772	1.465	1.685	1.700	1.625	1.628	2.398	2.414
FE3	0.557	0.543	0.627	0.643	0.651	0.640	0.710	0.688	0.538	0.573
FE2	0.903	0.882	1.018	1.043	1.057	1.039	1.152	1.117	0.872	0.928
MN	0.026	0.012	0.033	0.031	0.026	0.034	0.034	0.037	0.011	0.011
MG	3.009	3.116	2.642	2.906	2.902	2.874	2.886	2.833	3.134	2.943
CA	1.817	1.818	1.770	1.671	1.672	1.738	1.613	1.664	1.907	1.879
K	0.022	0.026	0.046	0.046	0.035	0.035	0.043	0.041	0.037	0.037
NA	0.713	0.751	0.550	0.575	0.590	0.880	0.715	0.700	0.639	0.644

LESSER ANTILLES PLUTONICS - LIST 28 - AMPHIBOLES (FE2O3/FEO=0.68)

	21	22	23	24	25	26	27	28	29	30
	103K7A3	104K10A1	105K10A2	106K11A1	107K11A2	108K11A3	357K12A1	358K12A2	1MK1A1	109F1A1
OXIDE WEIGHT PERCENTAGE										
SIO2	41.07	43.14	43.57	42.98	43.21	42.15	41.36	41.86	40.80	40.71
TIO2	2.11	2.83	3.06	1.76	1.83	1.63	2.20	2.02	1.99	1.91
AL2O3	14.03	10.32	11.50	12.17	12.17	13.92	15.14	15.34	15.50	14.01
FE2O3	5.03	7.09	6.64	5.72	5.43	5.55	4.32	4.04	3.96	4.88
FEO	7.34	10.33	9.69	8.34	7.91	8.16	6.30	5.90	5.79	7.13
MNO	0.10	0.24	0.20	0.25	0.21	0.18	0.10	0.09	0.11	0.13
MGO	14.51	11.33	11.10	13.74	13.74	12.30	14.71	15.56	14.60	13.98
CAO	12.18	11.16	11.01	11.45	11.70	12.09	12.58	12.36	13.10	12.34
K2O	0.21	0.26	0.29	0.11	0.09	0.08	0.23	0.20	0.20	0.22
NA2O	2.38	2.93	2.93	2.15	2.40	2.58	2.22	2.21	2.24	2.82
TOTAL	98.94	99.63	99.99	98.67	98.69	98.64	99.16	99.58	98.29	98.13
ATOMIC PROPORTIONS ON THE BASIS OF 23 OXYGENS										
SI	5.935	6.299	6.293	6.229	6.249	6.117	5.917	5.936	5.882	5.941
TI	0.229	0.311	0.332	0.192	0.199	0.178	0.237	0.215	0.216	0.210
AL	2.391	1.777	1.958	2.079	2.075	2.382	2.554	2.565	2.635	2.410
FE3	0.547	0.779	0.722	0.624	0.591	0.606	0.465	0.431	0.430	0.536
FE2	0.887	1.262	1.171	1.011	0.957	0.991	0.754	0.700	0.698	0.870
MN	0.012	0.030	0.024	0.031	0.026	0.022	0.012	0.011	0.013	0.016
MG	3.125	2.466	2.389	2.968	2.961	2.660	3.136	3.288	3.137	3.040
CA	1.883	1.746	1.704	1.778	1.813	1.880	1.929	1.878	2.024	1.930
K	0.039	0.048	0.053	0.020	0.017	0.015	0.042	0.036	0.037	0.041
NA	0.667	0.830	0.821	0.604	0.673	0.726	0.616	0.608	0.626	0.798

LESSER ANTILLES PLUTONICS - LIST 28 - AMPHIBOLES (FE2O3/FEO=0.68)

	31	32	33	34	35	36	37	38	39	40
	110F1A2	111F1A3	359F2A1	360F2A2	JRF47CA1	JRF47DA1	1MF1A1	1MF2A1	1MF3A1	24D4A1
OXIDE WEIGHT PERCENTAGE										
SIO2	41.10	40.08	41.42	42.59	40.39	40.68	40.50	39.30	41.20	41.94
TIO2	1.87	1.94	1.60	1.45	1.80	1.63	2.03	1.93	1.95	2.91
AL2O3	14.37	14.43	14.07	13.17	14.88	14.64	15.40	13.90	14.60	13.67
FE2O3	4.61	4.77	4.73	4.85	4.25	4.82	5.64	6.48	5.76	4.81
FEO	6.71	6.96	6.90	7.07	6.21	7.02	8.22	9.46	8.41	7.01
MNO	0.15	0.14	0.14	0.24	0.14	0.15	0.16	0.20	0.16	0.24
MGO	14.26	14.63	14.39	14.90	16.26	15.83	13.80	13.30	14.10	14.20
CAO	12.18	12.19	11.94	11.49	11.80	11.76	12.20	11.40	12.30	11.69
K2O	0.28	0.26	0.24	0.22	0.22	0.20	0.21	0.24	0.21	0.34
NA2O	2.59	3.05	2.32	2.24	2.39	2.48	2.00	1.91	2.15	2.22
TOTAL	98.12	98.45	97.75	98.22	98.34	99.21	100.16	98.12	100.84	99.03
ATOMIC PROPORTIONS ON THE BASIS OF 23 OXYGENS										
SI	5.968	5.837	6.028	6.157	5.832	5.852	5.807	5.811	5.876	6.028
TI	0.204	0.212	0.175	0.158	0.196	0.176	0.219	0.215	0.209	0.315
AL	2.460	2.478	2.414	2.245	2.533	2.483	2.603	2.423	2.455	2.317
FE3	0.504	0.523	0.518	0.528	0.462	0.522	0.609	0.721	0.618	0.520
FE2	0.815	0.848	0.840	0.855	0.750	0.845	0.986	1.170	1.003	0.843
MN	0.018	0.017	0.017	0.029	0.017	0.018	0.019	0.025	0.019	0.029
MG	3.086	3.175	3.121	3.210	3.499	3.394	2.949	2.931	2.997	3.042
CA	1.895	1.902	1.862	1.780	1.826	1.813	1.875	1.806	1.880	1.801
K	0.052	0.048	0.045	0.041	0.041	0.037	0.038	0.045	0.038	0.062
NA	0.730	0.862	0.655	0.628	0.669	0.692	0.556	0.548	0.595	0.619

LESSER ANTILLES PLUTONICS - LIST 28 - AMPHIBOLES (FE2O3/FEO=0.68)

	41	42	43	44	45	46	47	48	49	50
	25D4A2	353D6A1	354D6A2	393D17A1	391D17A2	392D18A1	393D18A2	355D20A1	356D20A2	394D21A1
OXIDE WEIGHT PERCENTAGE										
SIO2	41.89	43.24	46.14	42.80	42.44	43.08	43.20	40.48	40.22	42.33
TIO2	2.65	1.69	1.68	1.89	2.34	2.54	2.69	1.77	1.73	2.46
AL2O3	13.21	11.94	8.34	11.54	11.66	11.13	10.95	15.55	16.18	11.56
FE2O3	4.77	7.57	7.27	4.86	5.03	5.58	5.45	3.74	3.77	5.27
FEO	6.97	11.34	10.61	7.08	7.34	8.15	7.93	5.46	5.51	7.68
MNO	0.21	0.58	0.35	0.17	0.20	0.30	0.28	0.09	0.13	0.19
MGO	14.02	10.89	11.20	14.50	14.65	12.94	13.53	15.14	15.14	14.19
CAO	11.79	11.01	10.81	11.64	11.84	11.36	11.31	12.60	12.59	11.40
K2O	0.32	0.29	0.34	0.40	0.32	0.26	0.23	0.38	0.39	0.33
NA2O	2.33	1.90	1.20	2.40	2.39	2.62	2.61	2.25	2.46	2.30
TOTAL	98.16	99.67	97.94	97.28	98.21	97.96	98.18	97.46	98.12	97.71
ATOMIC PROPORTIONS ON THE BASIS OF 23 OXYGENS										
SI	6.077	6.306	6.776	6.266	6.175	6.302	6.296	5.874	5.805	6.194
TI	0.289	0.185	0.186	0.208	0.256	0.279	0.295	0.193	0.188	0.271
AL	2.259	1.984	1.444	1.992	2.000	1.920	1.881	2.660	2.754	1.994
FE3	0.521	0.831	0.803	0.535	0.551	0.614	0.598	0.408	0.410	0.580
FE2	0.846	1.347	1.303	0.867	0.893	0.997	0.967	0.663	0.665	0.940
MN	0.026	0.062	0.044	0.021	0.025	0.037	0.035	0.011	0.016	0.024
MG	3.031	2.367	2.451	3.164	3.177	2.821	2.939	3.274	3.257	3.095
CA	1.833	1.721	1.701	1.826	1.846	1.781	1.766	1.959	1.947	1.788
K	0.059	0.054	0.064	0.075	0.059	0.049	0.043	0.070	0.072	0.062
NA	0.656	0.537	0.342	0.682	0.675	0.743	0.738	0.633	0.689	0.653

LESSER ANTILLES PLUTONICS - LIST 28 - AMPHIBOLES (FE203/FEO=0.68)

	51	52	53	54	55	56	57	58	59	60
	395D21A2	386M1A1	387M1A2	388M2A1	389M2A2	396L1A1	397L1A2	381L2A1	382L2A2	363L4A1
OXIDE WEIGHT PERCENTAGE										
SIO2	43.07	46.51	46.47	48.12	47.87	44.08	43.77	40.10	40.06	44.73
TIO2	2.16	1.76	1.98	1.46	1.58	2.34	1.99	2.18	2.22	1.23
AL203	11.10	7.93	7.95	6.37	6.92	12.30	13.71	14.94	14.41	11.42
FE203	5.15	5.35	5.44	5.87	5.74	4.16	4.66	4.62	4.55	5.62
FEO	7.50	7.80	7.93	8.57	8.38	6.06	6.80	6.73	6.63	8.19
MNO	0.24	0.25	0.25	0.32	0.53	0.16	0.15	0.14	0.16	0.41
MGO	14.41	14.35	14.26	14.24	14.47	15.28	14.80	14.35	14.17	13.48
CAO	11.42	11.25	11.31	11.23	11.66	11.40	11.48	12.27	12.26	10.87
K20	0.31	0.31	0.26	0.13	0.23	0.38	0.40	0.16	0.25	0.16
NA20	2.49	2.08	2.60	1.46	1.43	2.20	1.86	2.59	2.47	1.71
TOTAL	97.85	97.59	98.45	97.77	98.81	98.36	99.62	98.08	97.18	97.82
ATOMIC PROPORTIONS ON THE BASIS OF 23 OXYGENS										
SI	6.283	6.764	6.720	6.980	6.885	6.308	6.203	5.836	5.884	6.488
TI	0.237	0.193	0.215	0.159	0.171	0.252	0.212	0.239	0.245	0.134
AL	1.909	1.360	1.355	1.089	1.173	2.075	2.291	2.564	2.495	1.953
FE3	0.565	0.586	0.592	0.641	0.621	0.448	0.497	0.506	0.503	0.613
FE2	0.915	0.949	0.959	1.040	1.008	0.725	0.806	0.819	0.814	0.994
MN	0.030	0.031	0.031	0.039	0.065	0.019	0.018	0.017	0.020	0.050
MG	3.133	3.110	3.073	3.078	3.102	3.259	3.126	3.112	3.102	2.914
CA	1.785	1.753	1.753	1.746	1.797	1.748	1.743	1.914	1.930	1.690
K	0.058	0.058	0.048	0.024	0.042	0.069	0.072	0.030	0.047	0.030
NA	0.705	0.587	0.729	0.411	0.399	0.611	0.511	0.731	0.704	0.481

LESSER ANTILLES PLUTONICS - LIST 2B - AMPHIBOLES (FE2O3/FEO=0.68)

	61	62	63	64	65	66	67	68	69	70
	364L4A2	383L6A1	384L6A2	385L6A3	361L10A1	362L10A2	377V1A1	378V1A2	JLV736A1	JLV770A1
OXIDE WEIGHT PERCENTAGE										
SIO2	45.74	45.43	42.70	42.50	41.33	41.11	41.56	41.00	40.96	41.21
TIO2	1.23	1.35	1.89	2.06	2.59	2.35	2.58	2.51	2.34	2.07
AL2O3	10.89	8.04	9.94	9.95	13.79	13.48	13.07	13.44	13.89	14.01
FE2O3	5.67	8.71	8.60	9.55	4.82	4.78	4.60	4.68	4.88	4.25
FEO	8.27	12.71	12.56	13.93	7.02	6.99	6.79	6.83	7.12	6.19
MNO	0.39	0.37	0.38	0.42	0.15	0.18	0.16	0.16	0.12	0.09
MGO	13.58	9.70	8.62	7.83	14.34	13.90	14.64	14.62	14.63	15.26
CAO	10.95	9.80	10.78	9.85	11.85	12.13	12.01	11.84	11.63	11.58
K2O	0.15	0.44	1.22	0.68	0.23	0.26	0.21	0.22	0.28	0.27
NA2O	1.80	1.46	1.45	1.59	2.54	2.50	2.67	2.76	2.43	2.43
TOTAL	98.67	98.01	98.14	98.36	98.66	97.68	98.29	98.06	98.28	97.36
ATOMIC PROPORTIONS ON THE BASIS OF 23 OXYGENS										
SI	6.572	6.760	6.420	6.401	5.975	6.010	6.028	5.968	5.947	5.996
TI	0.133	0.151	0.214	0.233	0.282	0.258	0.281	0.275	0.256	0.227
AL	1.845	1.410	1.762	1.767	2.351	2.324	2.235	2.307	2.378	2.403
FE3	0.613	0.975	0.973	1.082	0.524	0.526	0.502	0.513	0.533	0.465
FE2	0.994	1.582	1.580	1.755	0.849	0.855	0.824	0.832	0.865	0.753
MN	0.047	0.047	0.048	0.054	0.018	0.022	0.020	0.020	0.015	0.011
MG	2.908	2.151	1.932	1.758	3.090	3.029	3.165	3.172	3.166	3.309
CA	1.686	1.563	1.737	1.590	1.836	1.900	1.867	1.847	1.810	1.806
K	0.028	0.084	0.234	0.131	0.042	0.049	0.039	0.041	0.052	0.050
NA	0.502	0.421	0.423	0.465	0.712	0.709	0.751	0.779	0.684	0.686

LESSER ANTILLES PLUTONICS - LIST 2B - AMPHIBOLES (FE2O3/FEO=0.68)

	71	72	73	74	75	76	77	78	79	80
	JLV774A1	JLV896A1	379B1A1	380B1A2	365C1A1	366C1A2	367C2A1	368C2A2	375C3A1	376C3A2
OXIDE WEIGHT PERCENTAGE										
SIO2	41.04	40.88	41.81	41.63	41.32	41.32	43.04	43.08	41.67	41.61
TIO2	1.87	2.54	3.22	3.26	1.94	1.99	1.81	2.12	2.06	1.84
AL2O3	13.87	14.23	13.13	13.92	13.97	13.67	12.57	12.26	13.03	13.89
FE2O3	4.91	4.81	5.22	5.05	5.00	5.06	5.02	5.07	5.17	4.90
FEO	7.16	7.00	7.62	7.36	7.28	7.38	7.33	7.40	7.54	7.13
MNO	0.15	0.09	0.23	0.20	0.19	0.17	0.27	0.27	0.21	0.19
MGO	14.24	14.74	12.70	13.14	13.93	13.82	14.27	14.33	14.14	13.90
CAO	11.54	11.59	11.77	12.01	12.13	12.14	11.73	11.54	11.79	12.02
K2O	0.30	0.28	0.42	0.45	0.31	0.30	0.26	0.29	0.31	0.32
NA2O	2.41	2.45	2.62	2.51	2.56	2.31	2.35	2.57	2.57	2.43
TOTAL	97.49	98.61	98.74	99.53	98.63	98.16	98.65	98.93	98.49	98.23
ATOMIC PROPORTIONS ON THE BASIS OF 23 OXYGENS										
SI	6.004	5.911	6.066	5.984	5.991	6.019	6.211	6.208	6.057	6.042
TI	0.206	0.276	0.351	0.352	0.212	0.218	0.196	0.230	0.225	0.201
AL	2.392	2.426	2.246	2.359	2.388	2.348	2.139	2.083	2.233	2.378
FE3	0.541	0.523	0.570	0.546	0.546	0.555	0.545	0.550	0.566	0.535
FE2	0.876	0.847	0.925	0.885	0.883	0.899	0.885	0.892	0.917	0.866
MN	0.019	0.011	0.028	0.024	0.023	0.021	0.033	0.033	0.026	0.023
MG	3.105	3.176	2.746	2.815	3.010	3.000	3.069	3.078	3.063	3.008
CA	1.809	1.796	1.830	1.850	1.885	1.895	1.814	1.782	1.837	1.870
K	0.056	0.052	0.078	0.083	0.057	0.056	0.048	0.053	0.058	0.059
NA	0.684	0.687	0.737	0.700	0.720	0.653	0.658	0.718	0.725	0.684

LESSER ANTILLES PLUTONICS - LIST 2B - AMPHIBOLES (FE2O3/FEO=0.68)

	81	82	83	84	85	86	87
	369X1A1	370X1A2	371X2A1	372X2A2	373X3A1	374X3A2	RAX245A1
OXIDE WEIGHT PERCENTAGE							
SIO2	42.08	41.37	42.28	41.57	40.86	40.85	42.78
TIO2	1.43	2.03	1.78	1.85	2.36	2.58	1.44
AL2O3	13.70	13.57	12.88	13.00	14.43	13.54	13.00
FE2O3	4.46	4.38	5.05	5.12	4.16	4.84	3.23
FEO	6.50	6.38	7.37	7.46	6.08	7.04	4.72
MNO	0.22	0.20	0.20	0.23	0.14	0.16	N D
MGO	14.84	14.81	14.19	14.09	14.81	14.11	16.24
CAO	11.94	11.94	11.85	11.79	12.42	12.20	12.33
K2O	0.44	0.49	0.43	0.39	0.79	0.73	0.56
NA2O	2.25	2.51	2.37	2.32	2.36	2.30	2.43
TOTAL	97.86	97.68	98.40	97.82	98.41	98.35	96.73
ATOMIC PROPORTIONS ON THE BASIS OF 23 OXYGENS							
SI	6.102	6.027	6.135	6.079	5.915	5.953	6.209
TI	0.156	0.222	0.194	0.203	0.257	0.283	0.157
AL	2.342	2.331	2.204	2.241	2.463	2.326	2.225
FE3	0.487	0.480	0.552	0.563	0.453	0.531	0.353
FE2	0.788	0.777	0.895	0.912	0.736	0.858	0.573
MN	0.027	0.025	0.025	0.028	0.017	0.020	0.000
MG	3.207	3.215	3.069	3.071	3.195	3.064	3.513
CA	1.856	1.864	1.843	1.848	1.927	1.905	1.918
K	0.081	0.091	0.080	0.073	0.146	0.136	0.104
NA	0.633	0.709	0.667	0.658	0.663	0.650	0.684

LESSER ANTILLES PLUTONICS - LIST 3 - CLINOPYROXENES

	1	2	3	4	5	6	7	8	9	10
	44E2L1	45E2L2	52E2L3	53E2L4	46E3L1	49E3L2	50E3L3	51E3L4	114K1L1	115K1L2
OXIDE WEIGHT PERCENTAGE										
SIO2	51.49	51.79	50.95	50.72	48.60	49.45	49.45	49.41	49.90	51.68
TIO2	0.56	0.46	0.48	0.55	0.69	0.71	0.72	0.70	0.53	0.32
AL2O3	3.23	2.95	3.03	3.32	5.43	4.54	5.18	4.78	3.78	2.74
CR2O3	N D	N D	N D	N D	N D	N D	N D	N D	0.02	-
FEO	7.62	7.82	7.94	8.77	8.26	8.24	8.63	8.16	8.43	8.07
MNO	0.20	0.25	0.23	0.23	0.20	0.20	0.22	0.04	0.32	0.26
MGO	14.61	14.48	14.93	14.76	13.66	13.60	13.25	14.13	14.41	14.78
CAO	22.09	22.06	21.87	21.44	22.37	22.29	22.60	22.09	22.44	21.97
NA2O	N D	N D	N D	N D	N D	N D	N D	N D	0.24	0.14
TOTAL	99.80	99.81	99.43	99.79	99.21	99.03	100.05	99.31	100.07	99.96
ATOMIC PROPORTIONS ON THE BASIS OF 6 OXYGENS										
SI	1.912	1.924	1.904	1.894	1.831	1.863	1.848	1.853	1.866	1.921
TI	0.016	0.013	0.013	0.015	0.020	0.020	0.020	0.020	0.015	0.009
AL	0.141	0.129	0.134	0.146	0.241	0.202	0.228	0.211	0.167	0.120
CR	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.001	0.000
FE2	0.237	0.243	0.248	0.274	0.260	0.260	0.270	0.256	0.264	0.251
MN	0.006	0.008	0.007	0.007	0.006	0.006	0.007	0.001	0.010	0.008
MG	0.809	0.802	0.832	0.821	0.767	0.764	0.738	0.790	0.803	0.819
CA	0.879	0.878	0.876	0.858	0.903	0.900	0.905	0.888	0.899	0.875
NA	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.017	0.010
END MEMBER COMPOSITIONS										
CA	45.53	45.49	44.62	43.76	46.63	46.64	47.15	45.89	45.51	44.81
MG	41.88	41.52	42.36	41.90	39.60	39.57	38.44	40.82	40.64	41.92
FE	12.59	12.99	13.02	14.34	13.77	13.79	14.41	13.30	13.86	13.27

LESSER ANTILLES PLUTONICS - LIST 3 - CLINOPYROXENES

	11	12	13	14	15	16	17	18	19	20
	116K2L1	121K2L2	122K3L1	123K3L2	125K3L3	127K5L1	128K5L2	129K5L3	149K8L1	150K8L2
OXIDE WEIGHT PERCENTAGE										
SIO2	50.14	51.35	52.45	52.64	52.12	52.61	52.00	53.34	51.44	50.89
TIO2	0.41	0.48	0.47	0.26	0.36	0.32	0.55	0.47	0.17	0.19
AL2O3	3.18	3.47	2.05	1.56	1.65	1.48	2.64	1.79	1.56	1.93
CR2O3	0.02	0.01	-	-	0.03	-	0.01	0.01	0.03	0.05
FEO	9.65	9.24	9.18	9.43	9.59	9.93	9.85	9.94	13.10	14.34
MNO	0.33	0.30	0.42	0.43	0.39	0.43	0.43	0.43	0.64	0.56
MGO	14.83	14.04	14.62	13.86	14.41	13.85	13.90	13.78	12.30	10.90
CAO	20.46	20.25	20.75	20.87	21.67	21.36	20.60	20.21	20.78	20.64
NA2O	0.27	0.45	0.13	0.31	0.29	0.19	0.20	0.25	0.53	1.00
TOTAL	99.29	99.59	100.07	99.36	100.51	100.17	100.18	100.22	100.55	100.50
ATOMIC PROPORTIONS ON THE BASIS OF 6 OXYGENS										
SI	1.889	1.918	1.949	1.973	1.941	1.964	1.936	1.979	1.946	1.940
TI	0.012	0.013	0.013	0.007	0.010	0.009	0.015	0.013	0.005	0.005
AL	0.141	0.153	0.090	0.069	0.072	0.065	0.116	0.078	0.070	0.087
CR	0.001	0.000	0.000	0.000	0.001	0.000	0.000	0.000	0.001	0.002
FE2	0.304	0.289	0.285	0.296	0.299	0.310	0.307	0.308	0.415	0.457
MN	0.011	0.009	0.013	0.014	0.012	0.014	0.014	0.014	0.021	0.018
MG	0.833	0.781	0.810	0.774	0.800	0.770	0.771	0.762	0.694	0.619
CA	0.826	0.810	0.826	0.838	0.865	0.854	0.822	0.804	0.843	0.843
NA	0.020	0.033	0.009	0.023	0.021	0.014	0.014	0.018	0.039	0.074
END MEMBER COMPOSITIONS										
CA	41.86	42.88	42.71	43.62	43.78	43.85	42.95	42.57	42.74	43.51
MG	42.20	41.35	41.85	40.29	40.48	39.54	40.31	40.37	35.18	31.96
FE	15.94	15.77	15.43	16.09	15.74	16.61	16.74	17.06	22.07	24.53

LESSER ANTILLES PLUTONICS - LIST 3 - CLINOPYROXENES

	21	22	23	24	25	26	27	28	29	30
	540K9L1	541K9L2	134K10L1	135K10L2	54D1L1	55D1L2	57D1L3	56D4L1	58D4L2	256D6L1
OXIDE WEIGHT PERCENTAGE										
SIO2	51.26	49.24	51.21	50.73	51.24	49.10	50.47	50.73	49.97	51.38
TIO2	0.38	0.75	0.80	0.72	0.60	0.81	0.65	0.44	0.62	0.33
AL2O3	2.01	4.28	2.80	2.90	3.41	4.43	3.39	4.14	4.35	1.32
CR2O3	0.02	0.03	0.06	0.04	-	0.03	0.01	0.11	0.11	0.03
FEO	9.88	9.23	9.33	9.21	7.55	8.43	7.78	8.26	8.06	12.99
MNO	0.46	0.33	0.35	0.27	0.18	0.28	0.26	0.24	0.23	0.61
MGO	14.37	13.93	15.68	15.56	14.71	13.96	14.25	14.63	14.25	12.82
CAO	20.54	21.49	19.94	19.72	22.16	22.30	22.39	21.68	22.36	19.87
NA2O	0.41	0.46	0.49	0.76	0.32	0.07	0.30	-	0.12	0.32
TOTAL	99.33	99.74	100.66	99.91	100.17	99.41	99.50	100.23	100.07	99.67
ATOMIC PROPORTIONS ON THE BASIS OF 6 OXYGENS										
SI	1.932	1.852	1.897	1.894	1.899	1.848	1.890	1.882	1.862	1.954
TI	0.011	0.021	0.022	0.020	0.017	0.023	0.018	0.012	0.017	0.009
AL	0.089	0.190	0.122	0.128	0.149	0.197	0.150	0.181	0.191	0.059
CR	0.001	0.001	0.002	0.001	0.000	0.001	0.000	0.003	0.003	0.001
FE2	0.311	0.290	0.289	0.288	0.234	0.265	0.244	0.256	0.251	0.413
MN	0.015	0.011	0.011	0.009	0.006	0.009	0.008	0.008	0.007	0.020
MG	0.807	0.781	0.866	0.866	0.812	0.783	0.795	0.809	0.792	0.727
CA	0.830	0.866	0.791	0.789	0.880	0.900	0.899	0.862	0.893	0.810
NA	0.030	0.034	0.035	0.055	0.023	0.005	0.022	0.000	0.009	0.024
END MEMBER COMPOSITIONS										
CA	42.26	44.47	40.44	40.44	45.55	45.97	46.18	44.55	45.96	41.12
MG	41.12	40.09	44.23	44.38	42.05	40.02	40.87	41.81	40.73	36.90
FE	16.62	15.45	15.33	15.18	12.40	14.02	12.95	13.64	13.30	21.98

LESSER ANTILLES PLUTONICS - LIST 3 - CLINOPYROXENES

	31	32	33	34	35	36	37	38	39	40
	259D6L2	260D8L1	261D8L2	59D12L1	3D14L1	4D14L2	7D16L1	8D16L2	264D17L1	265D17L2
OXIDE WEIGHT PERCENTAGE										
SIO2	51.86	51.31	50.46	49.60	51.06	51.54	50.72	52.08	51.07	51.04
TIO2	0.22	0.48	0.53	0.72	0.42	0.42	0.45	0.29	0.54	0.57
AL2O3	1.09	2.83	3.76	4.84	2.87	3.70	2.81	1.84	2.98	3.11
CR2O3	-	0.03	-	0.04	0.03	0.01	-	0.01	-	-
FEO	12.22	8.07	7.38	7.85	8.60	7.74	8.64	9.24	7.68	7.69
MNO	0.54	0.29	0.22	0.23	0.20	-	0.27	0.30	0.19	0.24
MGO	12.65	15.24	14.29	14.03	14.95	14.41	14.68	14.77	14.64	14.68
CAO	20.84	20.76	22.42	22.67	20.90	21.99	21.34	21.04	22.06	22.03
NA2O	0.44	0.44	0.27	0.08	N D	N D	N D	N D	0.19	0.31
TOTAL	99.86	99.45	99.33	100.06	99.03	99.81	98.91	99.57	99.35	99.67
ATOMIC PROPORTIONS ON THE BASIS OF 6 OXYGENS										
SI	1.966	1.915	1.888	1.849	1.915	1.911	1.910	1.948	1.909	1.903
TI	0.006	0.013	0.015	0.020	0.012	0.012	0.013	0.008	0.015	0.016
AL	0.049	0.124	0.166	0.213	0.127	0.162	0.125	0.081	0.131	0.137
CR	0.000	0.001	0.000	0.001	0.001	0.000	0.000	0.000	0.000	0.000
FE2	0.387	0.252	0.231	0.245	0.270	0.240	0.272	0.289	0.240	0.240
MN	0.017	0.009	0.007	0.007	0.006	0.000	0.009	0.010	0.006	0.008
MG	0.715	0.847	0.797	0.779	0.836	0.796	0.824	0.823	0.816	0.816
CA	0.846	0.830	0.899	0.906	0.840	0.874	0.861	0.843	0.884	0.880
NA	0.032	0.032	0.020	0.006	0.000	0.000	0.000	0.000	0.014	0.022
END MEMBER COMPOSITIONS										
CA	43.06	42.82	46.49	46.75	43.04	45.74	43.81	42.91	45.42	45.29
MG	36.35	43.72	41.21	40.24	42.81	41.69	41.91	41.89	41.92	41.97
FE	20.59	13.46	12.30	13.01	14.15	12.57	14.28	15.19	12.65	12.73

LESSER ANTILLES PLUTONICS - LIST 3 - CLINOPYROXENES

	41	42	43	44	45	46	47	48	49	50
	275D18L1	276D18L2	542D20L1	277D21L1	278D21L2	210M1L1	211M1L2	216M2L1	217M2L2	228L1L1
OXIDE WEIGHT PERCENTAGE										
SIO2	51.86	52.00	48.86	50.22	51.48	51.66	51.98	51.39	51.38	51.21
TIO2	0.53	0.30	0.70	0.78	0.50	0.20	0.23	0.28	0.60	0.30
AL2O3	2.81	1.75	6.07	4.16	2.80	1.35	1.59	1.35	1.87	4.07
CR2O3	0.01	-	0.09	0.03	0.04	0.05	0.06	-	0.02	1.37
FEO	8.85	9.24	6.33	7.82	7.86	9.22	9.15	10.44	10.17	3.14
MNO	0.36	0.49	0.15	0.26	0.29	0.39	0.41	0.88	0.60	0.11
MGO	14.49	15.13	14.09	14.43	14.69	14.84	14.76	16.06	14.51	15.74
CAO	21.19	20.99	23.24	22.15	22.14	21.23	21.78	18.92	20.51	23.27
NA2O	0.30	0.39	0.22	0.30	0.20	0.39	0.43	0.31	0.48	0.16
TOTAL	100.40	100.29	99.75	100.15	100.00	99.33	100.39	99.63	100.14	99.37
ATOMIC PROPORTIONS ON THE BASIS OF 6 OXYGENS										
SI	1.923	1.936	1.819	1.868	1.914	1.945	1.937	1.932	1.925	1.885
TI	0.015	0.008	0.020	0.022	0.014	0.006	0.006	0.008	0.017	0.008
AL	0.123	0.077	0.266	0.182	0.123	0.060	0.070	0.060	0.083	0.177
CR	0.000	0.000	0.003	0.001	0.001	0.001	0.002	0.000	0.001	0.040
FE2	0.274	0.288	0.197	0.243	0.244	0.290	0.285	0.328	0.319	0.097
MN	0.011	0.015	0.005	0.008	0.009	0.012	0.013	0.028	0.019	0.003
MG	0.801	0.840	0.782	0.800	0.814	0.833	0.820	0.900	0.810	0.863
CA	0.842	0.838	0.927	0.883	0.882	0.856	0.870	0.762	0.824	0.918
NA	0.022	0.028	0.016	0.022	0.014	0.028	0.031	0.023	0.035	0.011
END MEMBER COMPOSITIONS										
CA	43.66	42.29	48.52	45.65	45.25	43.00	43.76	37.77	41.77	48.79
MG	41.52	42.40	40.91	41.35	41.75	41.80	41.24	44.58	41.10	45.89
FE	14.82	15.31	10.56	13.00	13.01	15.20	15.00	17.65	17.13	5.32

LESSER ANTILLES PLUTONICS - LIST 3 - CLINOPYROXENES

	51	52	53	54	55	56	57	58	59	60
	231L1L2	224L2L1	225L2L2	234L4L1	235L4L2	268L6L1	269L6L2	222L9L1	223L9L2	226L10L1
OXIDE WEIGHT PERCENTAGE										
SIO2	52.34	48.34	47.73	50.86	50.13	50.94	50.47	48.82	51.49	49.28
TIO2	0.30	0.82	0.90	0.26	0.17	0.09	0.34	0.79	0.57	0.79
AL2O3	2.92	5.58	6.17	2.79	2.25	0.99	1.27	3.83	3.00	4.67
CR2O3	0.16	0.01	-	0.09	0.14	0.02	0.02	0.04	0.02	0.01
FEO	4.33	7.81	7.78	10.30	9.76	14.49	14.37	10.15	9.22	7.79
MNO	0.16	0.22	0.16	0.49	0.51	0.56	0.52	0.36	0.32	0.18
MGO	16.61	13.65	13.37	14.31	14.71	11.19	10.79	13.88	14.55	13.86
CAO	22.82	22.53	23.00	20.89	21.04	21.76	21.76	20.77	21.22	22.58
NA2O	0.10	0.18	0.18	0.18	0.45	0.47	0.48	0.51	0.36	0.30
TOTAL	99.74	99.14	99.29	100.17	99.16	100.51	100.02	99.15	100.75	99.46
ATOMIC PROPORTIONS ON THE BASIS OF 6 OXYGENS										
SI	1.920	1.822	1.799	1.906	1.901	1.948	1.940	1.855	1.907	1.850
TI	0.008	0.023	0.026	0.007	0.005	0.003	0.010	0.023	0.016	0.022
AL	0.126	0.248	0.274	0.123	0.101	0.045	0.058	0.172	0.131	0.207
CR	0.005	0.003	0.000	0.003	0.004	0.001	0.001	0.001	0.001	0.000
FE2	0.133	0.246	0.245	0.323	0.310	0.464	0.462	0.323	0.286	0.245
MN	0.005	0.007	0.005	0.016	0.016	0.018	0.017	0.012	0.010	0.006
MG	0.908	0.767	0.751	0.799	0.831	0.638	0.618	0.786	0.803	0.775
CA	0.897	0.910	0.929	0.839	0.855	0.892	0.896	0.846	0.842	0.908
NA	0.007	0.013	0.013	0.013	0.033	0.035	0.036	0.038	0.026	0.022
END MEMBER COMPOSITIONS										
CA	46.17	47.15	48.12	42.44	42.49	44.34	44.97	43.02	43.39	46.97
MG	46.74	39.73	38.90	40.43	41.31	31.71	31.01	39.98	41.38	40.09
FE	7.09	13.12	12.97	17.12	16.20	23.95	24.03	17.00	15.23	12.94

LESSER ANTILLES PLUTONICS - LIST 3 - CLINOPYROXENES

	61	62	63	64	65	66	67	68	69	70
	227L10L2	270V1L1	271V1L2	272V1L3	238V2F1	240V2F2	241V2F3	242V2F4	245V2W1	JLV731L1
OXIDE WEIGHT PERCENTAGE										
SIO2	51.34	49.25	48.65	50.48	38.90	40.28	37.62	41.24	51.29	50.64
TIO2	0.40	0.75	0.96	0.53	0.92	1.75	1.00	0.82	0.04	0.57
AL2O3	2.47	4.62	5.38	3.32	17.71	11.80	18.65	14.93	0.29	2.54
CR2O3	-	0.05	0.01	-	0.01	0.01	-	0.01	-	N D
FEO	8.77	7.61	7.91	7.16	9.46	14.21	10.02	7.40	0.42	10.91
MNO	0.35	0.26	0.24	0.26	0.18	0.18	0.16	0.14	0.15	0.39
MGO	14.51	13.83	13.82	14.85	7.59	6.83	7.12	9.30	0.39	14.51
CAO	21.48	22.01	22.14	22.14	24.54	24.31	24.36	24.99	47.64	19.75
NA2O	0.30	0.82	0.70	0.65	0.31	0.41	0.36	0.18	0.39	0.52
TOTAL	99.62	99.20	99.81	99.39	99.62	99.78	99.29	99.01	100.61	99.83
ATOMIC PROPORTIONS ON THE BASIS OF 6 OXYGENS										
SI	1.922	1.853	1.823	1.889	1.491	1.582	1.453	1.573	1.977	1.906
TI	0.011	0.021	0.027	0.015	0.027	0.052	0.029	0.024	0.001	0.016
AL	0.109	0.205	0.238	0.146	0.800	0.546	0.849	0.672	0.013	0.113
CR	0.000	0.001	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
FE2	0.275	0.239	0.248	0.224	0.303	0.467	0.324	0.236	0.014	0.343
MN	0.011	0.008	0.008	0.008	0.006	0.006	0.005	0.005	0.005	0.012
MG	0.810	0.775	0.772	0.828	0.434	0.400	0.410	0.529	0.022	0.814
CA	0.862	0.887	0.889	0.888	1.008	1.023	1.008	1.022	1.968	0.797
NA	0.022	0.060	0.051	0.047	0.023	0.031	0.027	0.013	0.029	0.038
END MEMBER COMPOSITIONS										
CA	44.03	46.45	46.39	45.57	57.58	53.97	57.71	57.04	97.97	40.51
MG	41.37	40.59	40.27	42.51	24.77	21.09	23.46	29.52	1.12	41.39
FE	14.60	12.97	13.33	11.93	17.66	24.94	18.83	13.44	0.92	18.10

LESSER ANTILLES PLUTONICS - LIST 3 - CLINOPYROXENES

	71	72	73	74	75	76	77	78	79	80
	JLV748L1	JLV770L1	JLV774L1	JLV896L1	IMV2L1	IMV3L1	247B1L1	248B1L2	249C1L1	250C1L2
OXIDE WEIGHT PERCENTAGE										
SIO2	49.48	48.73	49.44	49.27	48.90	48.70	51.10	50.92	50.74	50.63
TIO2	0.86	0.81	0.78	0.81	0.76	0.88	0.79	0.85	0.51	0.51
AL2O3	4.78	5.98	5.08	5.34	5.55	5.99	2.92	3.12	3.65	3.70
CR2O3	N.D.	0.05	N.D.	N.D.	-	-	-	0.02	-	0.03
FEO	7.83	7.19	7.81	7.38	7.76	7.22	8.37	8.11	7.64	7.90
MNO	0.19	0.15	0.17	0.18	0.20	0.15	0.23	0.25	0.24	0.26
MGO	14.62	14.43	14.58	14.62	14.70	14.40	14.26	13.61	14.20	14.05
CAO	21.80	22.49	21.82	22.17	22.70	23.10	22.19	22.58	22.91	23.27
NA2O	0.24	0.26	0.26	0.25	0.05	0.10	0.07	0.17	0.41	0.18
TOTAL	99.80	100.09	99.94	100.02	100.62	100.54	99.93	99.63	100.30	100.53
ATOMIC PROPORTIONS ON THE BASIS OF 6 OXYGENS										
SI	1.846	1.812	1.841	1.832	1.814	1.806	1.906	1.905	1.886	1.881
TI	0.024	0.023	0.022	0.023	0.021	0.025	0.022	0.024	0.014	0.014
AL	0.210	0.262	0.223	0.234	0.243	0.262	0.128	0.138	0.160	0.162
CR	0.000	0.001	0.000	0.000	0.000	0.000	0.000	0.001	0.000	0.001
FE2	0.244	0.224	0.243	0.230	0.241	0.224	0.261	0.254	0.237	0.245
MN	0.006	0.005	0.005	0.006	0.006	0.005	0.007	0.008	0.008	0.008
MG	0.813	0.800	0.809	0.810	0.813	0.796	0.793	0.759	0.787	0.778
CA	0.872	0.896	0.871	0.883	0.902	0.918	0.887	0.906	0.912	0.926
NA	0.017	0.019	0.019	0.018	0.004	0.007	0.005	0.012	0.030	0.013
END MEMBER COMPOSITIONS										
CA	45.05	46.57	45.35	45.80	45.99	47.26	45.53	47.01	46.94	47.32
MG	42.01	41.56	41.96	42.00	41.42	40.97	40.69	39.40	40.46	39.73
FE	12.94	11.87	12.89	12.19	12.59	11.77	13.78	13.59	12.61	12.96

LESSER ANTILLES PLUTONICS - LIST 3 - CLINOPYROXENES

	81	82	83	84	85	86	87	88	89	90
	251C2L1	252C2L2	253C3L1	254C3L2	255C3L3	284X1L1	285X1L2	286X1L3	280X2L1	281X2L2
OXIDE WEIGHT PERCENTAGE										
SIO2	51.16	51.76	50.85	50.38	50.43	51.72	48.82	50.78	49.79	50.50
TIO2	0.43	0.36	0.39	0.39	0.57	0.41	0.72	0.41	0.54	0.45
AL2O3	2.97	2.31	3.31	3.54	3.71	3.15	6.04	3.87	4.28	3.28
CR2O3	0.03	0.02	0.02	0.02	0.01	0.06	0.06	0.17	-	-
FEO	7.90	7.97	7.74	7.86	7.65	6.99	7.22	6.34	7.95	8.00
MNO	0.38	0.45	0.28	0.28	0.24	0.29	0.21	0.24	0.32	0.34
MGO	14.67	15.11	14.75	14.59	14.26	14.65	13.10	14.74	13.77	14.24
CAO	21.72	21.69	22.77	22.42	22.98	23.04	23.30	23.59	23.07	23.07
NA2O	0.33	0.34	0.30	0.30	0.24	0.38	0.23	0.25	0.34	0.36
TOTAL	99.59	100.01	100.41	99.78	100.09	100.69	99.70	100.39	100.06	100.24
ATOMIC PROPORTIONS ON THE BASIS OF 6 OXYGENS										
SI	1.910	1.925	1.888	1.883	1.879	1.907	1.826	1.878	1.861	1.884
TI	0.012	0.010	0.011	0.011	0.016	0.011	0.020	0.011	0.015	0.013
AL	0.131	0.101	0.145	0.156	0.163	0.137	0.266	0.169	0.189	0.144
CR	0.001	0.001	0.001	0.001	0.000	0.002	0.002	0.005	0.000	0.000
FE2	0.247	0.248	0.240	0.246	0.238	0.216	0.226	0.196	0.249	0.250
MN	0.012	0.014	0.009	0.009	0.008	0.009	0.007	0.008	0.010	0.011
MG	0.816	0.837	0.816	0.813	0.792	0.805	0.730	0.812	0.767	0.792
CA	0.869	0.864	0.906	0.898	0.918	0.910	0.934	0.935	0.924	0.923
NA	0.024	0.025	0.022	0.022	0.017	0.027	0.017	0.018	0.025	0.026
END MEMBER COMPOSITIONS										
CA	44.70	44.31	45.96	45.69	46.93	46.93	49.24	47.92	47.39	46.71
MG	41.99	42.64	41.40	41.35	40.50	41.53	38.50	41.64	39.34	40.10
FE	13.31	13.34	12.64	12.95	12.58	11.58	12.26	10.44	13.27	13.19

LESSER ANTILLES PLUTONICS - LIST 3 - CLINOPYROXENES

	91	92	93	94	95	96
	282X3L1	283X3L2	221X4L1	287X4L2	288X4L3	RAX245L1
OXIDE WEIGHT PERCENTAGE						
SIO2	50.56	51.13	46.64	51.91	50.06	50.27
TIO2	0.72	0.63	0.96	0.43	0.72	0.48
AL2O3	4.03	3.62	6.64	3.11	4.51	4.54
CR2O3	0.32	0.09	0.57	0.52	0.14	N D
FEO	6.12	6.51	5.65	4.18	6.20	5.24
MNO	0.17	0.20	0.11	0.17	0.16	N D
MGO	14.41	14.56	14.78	16.04	15.71	15.10
CAO	23.71	23.84	23.55	23.82	22.60	23.25
NA2O	0.19	0.26	0.66	0.20	0.22	0.27
TOTAL	100.23	100.84	99.56	100.38	100.32	99.15
ATOMIC PROPORTIONS ON THE BASIS OF 6 OXYGENS						
SI	1.872	1.884	1.750	1.900	1.848	1.869
TI	0.020	0.017	0.027	0.012	0.020	0.013
AL	0.176	0.157	0.294	0.134	0.196	0.199
CR	0.009	0.003	0.017	0.015	0.004	0.000
FE2	0.189	0.201	0.177	0.128	0.191	0.163
MN	0.005	0.006	0.003	0.005	0.005	0.000
MG	0.795	0.799	0.827	0.875	0.864	0.837
CA	0.941	0.941	0.947	0.935	0.894	0.926
NA	0.014	0.019	0.048	0.014	0.016	0.019
END MEMBER COMPOSITIONS						
CA	48.73	48.33	48.46	48.10	45.74	48.10
MG	41.18	41.05	42.29	45.04	44.21	43.44
FE	10.09	10.62	9.25	6.86	10.05	8.46

LESSER ANTILLES PLUTONICS - LIST 4 - ORTHOPYROXENES

	1	2	3	4	5	6	7	8	9	10
	262A1R1	263A1R2	266E2R1	267E2R2	47E3R1	48E3R2	119K2R1	117K2R2	124K3R1	126K3R2
OXIDE WEIGHT PERCENTAGE										
SIO2	53.14	52.00	53.43	53.81	54.12	53.65	52.25	51.97	53.73	53.80
TIO2	0.04	0.04	0.12	0.14	0.07	0.07	0.30	0.28	0.24	0.24
AL203	0.44	1.10	2.07	1.24	1.23	1.21	1.39	1.44	1.12	1.05
CR203	0.02	0.04	-	-	N D	N D	-	-	0.02	0.02
FEO	21.28	22.41	16.69	16.86	17.33	19.13	20.87	20.20	20.22	19.94
MNO	1.17	1.45	0.49	0.48	1.04	0.88	0.62	0.61	0.77	0.73
MGO	23.03	22.33	25.89	25.30	25.03	24.49	23.06	23.15	22.93	22.40
CAO	0.24	0.34	1.16	1.20	1.38	1.41	1.41	1.40	1.40	1.28
NA20	0.03	-	0.03	0.04	N D	N D	0.38	0.16	-	-
TOTAL	99.39	99.71	99.88	99.07	100.20	100.84	100.28	99.21	100.43	99.46
ATOMIC PROPORTIONS ON THE BASIS OF 6 OXYGENS										
SI	1.985	1.953	1.943	1.973	1.971	1.959	1.939	1.943	1.976	1.993
TI	0.001	0.001	0.003	0.004	0.002	0.002	0.008	0.008	0.007	0.007
AL	0.019	0.049	0.089	0.054	0.053	0.052	0.061	0.063	0.049	0.046
CR	0.001	0.001	0.000	0.000	0.000	0.000	0.000	0.000	0.001	0.001
FE2	0.665	0.704	0.508	0.517	0.528	0.584	0.648	0.632	0.622	0.618
MN	0.037	0.046	0.015	0.015	0.032	0.027	0.019	0.019	0.024	0.023
MG	1.282	1.250	1.403	1.383	1.359	1.332	1.275	1.290	1.257	1.237
CA	0.010	0.014	0.045	0.047	0.054	0.055	0.056	0.056	0.055	0.051
NA	0.002	0.000	0.002	0.003	0.000	0.000	0.027	0.012	0.000	0.000
END MEMBER COMPOSITIONS										
CA	0.48	0.68	2.29	2.40	2.73	2.76	2.81	2.81	2.82	2.64
MG	64.31	62.07	71.19	70.48	68.88	66.66	63.81	64.59	64.19	64.14
FE	35.21	37.25	26.52	27.12	28.39	30.58	33.39	32.60	32.99	33.23

LESSER ANTILLES PLUTONICS - LIST 4 - ORTHOPYROXENES

	11	12	13	14	15	16	17	18	19	20
	534K4R1	535K4R2	130K5R1	131K5R2	147K8R1	148K8R2	538K9R1	539K9R2	132K10R1	133K10R2
OXIDE WEIGHT PERCENTAGE										
SIO2	52.83	52.83	54.81	54.99	50.60	50.40	53.23	50.97	52.12	52.75
TIO2	0.12	0.09	0.17	0.16	0.13	0.15	0.17	0.08	0.23	0.07
AL2O3	1.49	1.72	0.81	0.69	0.82	0.77	1.31	0.23	0.81	0.60
CR2O3	-	0.02	-	-	0.02	0.03	-	0.02	-	0.03
FEO	20.77	19.85	20.41	20.59	26.44	27.74	16.79	28.90	19.82	24.40
MNO	0.92	0.86	0.81	0.82	1.10	1.15	0.63	1.22	0.63	1.35
MGO	23.71	23.84	21.64	21.77	19.39	18.39	26.45	16.86	24.87	20.74
CAO	0.97	1.15	1.30	1.19	0.82	1.40	1.42	1.22	1.63	0.65
NA2O	-	0.04	-	-	-	0.33	-	-	0.20	0.07
TOTAL	100.81	100.40	99.95	100.21	99.32	100.36	100.00	99.50	100.31	100.66
ATOMIC PROPORTIONS ON THE BASIS OF 6 OXYGENS										
SI	1.944	1.944	2.021	2.023	1.949	1.940	1.940	1.984	1.928	1.978
TI	0.003	0.002	0.005	0.004	0.004	0.004	0.005	0.002	0.006	0.002
AL	0.065	0.075	0.035	0.030	0.037	0.035	0.056	0.011	0.035	0.027
CR	0.000	0.001	0.000	0.000	0.001	0.001	0.000	0.001	0.000	0.001
FE2	0.639	0.611	0.629	0.633	0.852	0.893	0.512	0.941	0.613	0.765
MN	0.029	0.027	0.025	0.026	0.036	0.038	0.019	0.040	0.020	0.043
MG	1.300	1.308	1.189	1.193	1.113	1.055	1.437	0.978	1.371	1.159
CA	0.038	0.045	0.051	0.047	0.034	0.058	0.055	0.051	0.065	0.026
NA	0.000	0.003	0.000	0.000	0.000	0.025	0.000	0.000	0.014	0.005
END MEMBER COMPOSITIONS										
CA	1.91	2.28	2.71	2.47	1.66	2.83	2.74	2.53	3.12	1.31
MG	64.80	65.68	62.74	62.83	54.71	51.63	71.00	48.66	66.28	58.15
FE	33.29	32.04	34.55	34.70	43.63	45.54	26.26	48.81	30.60	40.54

LESSER ANTILLES PLUTONICS - LIST 4 - ORTHOPYROXENES

	21	22	23	24	25	26	27	28	29	30
	136K10R3	139K11R1	140K11R2	141K11R3	144K11R4	257D6R1	258D6R2	5D16R1	6D16R2	273D18R1
OXIDE WEIGHT PERCENTAGE										
SIO2	53.06	52.65	52.58	53.21	51.41	51.17	51.17	54.52	55.98	53.59
TIO2	0.23	0.15	0.14	0.09	0.12	0.09	0.13	0.13	0.17	0.23
AL2O3	0.80	1.59	1.98	1.71	2.07	0.44	0.42	1.03	1.12	1.18
CR2O3	0.03	N D	N D	N D	0.03	0.02	-	0.31	0.01	-
FEO	19.54	18.57	19.31	18.23	20.96	28.36	27.88	17.57	17.43	18.94
MNO	0.68	0.73	0.77	0.69	0.81	1.27	1.27	0.58	0.55	0.79
MGO	24.54	24.43	24.05	24.51	23.16	17.34	17.68	23.98	24.31	23.92
CAO	1.56	1.14	0.92	1.02	1.00	1.07	1.16	1.30	1.40	1.31
NA2O	0.22	0.21	0.07	0.23	0.20	-	0.04	N D	N D	0.15
TOTAL	100.66	99.47	99.82	99.69	99.76	99.76	99.75	99.42	100.97	100.11
ATOMIC PROPORTIONS ON THE BASIS OF 6 OXYGENS										
SI	1.949	1.946	1.940	1.955	1.919	1.979	1.976	1.997	2.011	1.968
TI	0.006	0.004	0.004	0.002	0.003	0.003	0.004	0.004	0.005	0.006
AL	0.035	0.069	0.086	0.074	0.091	0.020	0.019	0.044	0.047	0.051
CR	0.001	0.000	0.000	0.000	0.001	0.001	0.000	0.009	0.000	0.000
FE2	0.600	0.574	0.596	0.560	0.654	0.918	0.901	0.538	0.524	0.582
MN	0.021	0.023	0.024	0.021	0.026	0.042	0.042	0.018	0.017	0.025
MG	1.343	1.345	1.322	1.342	1.288	1.000	1.018	1.309	1.301	1.309
CA	0.061	0.045	0.036	0.040	0.040	0.044	0.048	0.051	0.054	0.052
NA	0.016	0.015	0.005	0.016	0.014	0.000	0.003	0.000	0.000	0.011
END MEMBER COMPOSITIONS										
CA	3.03	2.27	1.84	2.04	1.99	2.21	2.39	2.66	2.84	2.62
MG	66.30	67.70	66.83	68.34	64.15	49.90	50.68	68.31	68.65	66.55
FE	30.67	30.03	31.33	29.62	33.86	47.88	46.93	29.03	28.51	30.83

LESSER ANTILLES PLUTONICS - LIST 4 - ORTHOPYROXENES

	31	32	33	34	35	36	37	38	39	40
	274D18R2	543D20R1	279D21R1	212M1R1	213M1R2	214M2R1	215M2R2	229L1R1	230L1R2	232L4R1
OXIDE WEIGHT PERCENTAGE										
SIO2	53.00	54.01	53.20	52.02	52.35	53.02	52.85	53.20	50.80	52.57
TIO2	0.18	0.16	0.21	0.11	0.05	0.13	0.12	0.39	0.10	0.07
AL203	1.27	0.83	1.54	0.83	0.85	0.70	0.73	0.71	0.46	1.20
CR203	0.01	0.01	-	0.05	0.02	0.04	0.03	0.02	-	0.03
FEO	19.01	16.48	17.96	22.45	22.47	21.35	21.78	18.57	29.82	21.09
MNO	0.76	0.44	0.59	0.88	0.93	1.63	1.67	0.54	0.79	0.91
MGO	24.56	26.32	24.82	22.86	22.33	22.90	22.43	23.64	16.45	22.29
CAO	1.34	1.24	1.32	1.00	0.90	0.83	0.83	1.95	0.90	1.12
NA2O	0.07	0.01	-	0.19	-	0.26	0.39	-	0.01	0.06
TOTAL	100.20	99.50	99.64	100.39	99.90	100.86	100.83	99.02	99.33	99.34
ATOMIC PROPORTIONS ON THE BASIS OF 6 OXYGENS										
SI	1.948	1.970	1.953	1.943	1.961	1.963	1.962	1.975	1.983	1.967
TI	0.005	0.004	0.006	0.003	0.001	0.004	0.003	0.011	0.003	0.002
AL	0.055	0.036	0.067	0.037	0.038	0.031	0.032	0.031	0.021	0.053
CR	0.000	0.000	0.000	0.001	0.001	0.001	0.001	0.001	0.000	0.001
FE2	0.584	0.503	0.552	0.701	0.704	0.661	0.676	0.577	0.974	0.660
MN	0.024	0.014	0.018	0.028	0.030	0.051	0.053	0.017	0.026	0.029
MG	1.345	1.431	1.358	1.273	1.247	1.263	1.241	1.308	0.957	1.243
CA	0.053	0.048	0.052	0.040	0.036	0.033	0.033	0.078	0.038	0.045
NA	0.005	0.001	0.000	0.014	0.000	0.019	0.028	0.000	0.001	0.004
END MEMBER COMPOSITIONS										
CA	2.63	2.43	2.62	1.96	1.79	1.64	1.65	3.92	1.89	2.27
MG	67.06	71.73	68.59	62.32	61.83	62.90	61.96	66.09	47.98	62.88
FE	30.31	25.88	28.78	35.71	36.38	35.46	36.39	29.99	50.13	34.85

LESSER ANTILLES PLUTONICS - LIST 4 - ORTHOPYROXENES

	41	42	43	44	45	46
	233L4R2	236L6R1	237L6R2	218X4R1	219X4R2	220X4R3
OXIDE WEIGHT PERCENTAGE						
SIO2	52.74	49.81	50.40	55.58	55.45	55.22
TIO2	0.07	0.11	0.09	0.07	0.01	0.05
AL2O3	0.98	0.63	0.46	3.47	1.72	3.06
CR2O3	0.03	0.01	0.01	0.13	0.09	0.12
FEO	21.15	32.87	33.35	8.11	8.05	8.37
MNO	0.92	1.07	1.15	0.19	0.23	0.17
MGO	22.52	15.00	14.05	32.18	33.77	31.85
CAO	1.16	1.30	0.81	0.97	0.98	0.87
NA2O	-	-	-	-	-	-
TOTAL	99.57	100.80	100.32	100.70	100.30	99.71
ATOMIC PROPORTIONS ON THE BASIS OF 6 OXYGENS						
SI	1.969	1.952	1.983	1.922	1.930	1.930
TI	0.002	0.003	0.003	0.002	0.000	0.001
AL	0.043	0.029	0.021	0.141	0.071	0.126
CR	0.001	0.000	0.000	0.004	0.002	0.003
FE2	0.661	1.077	1.098	0.235	0.234	0.245
MN	0.029	0.036	0.038	0.006	0.007	0.005
MG	1.253	0.876	0.824	1.658	1.751	1.659
CA	0.046	0.055	0.034	0.036	0.037	0.033
NA	0.000	0.000	0.000	0.000	0.000	0.000
END MEMBER COMPOSITIONS						
CA	2.33	2.67	1.71	1.86	1.80	1.68
MG	63.00	42.87	41.32	85.73	86.32	85.46
FE	34.67	54.46	56.97	12.41	11.88	12.86

LESSER ANTILLES PLUTONICS - LIST 5 - OLIVINES

	1	2	3	4	5	6	7	8	9	10
	42E201	43E202	112K101	113K102	118K201	120K202	536K401	537K402	137K1001	138K1002
OXIDE WEIGHT PERCENTAGE										
SIO2	36.60	37.07	37.00	37.20	36.65	36.98	36.48	36.25	37.77	37.70
TIO2	-	-	0.02	0.01	-	0.02	N D	N D	0.03	0.03
AL2O3	0.11	0.12	0.16	0.10	0.59	0.04	N D	N D	0.09	0.10
FEO	27.69	27.28	27.35	28.18	29.52	29.14	31.05	30.81	25.70	26.54
MNO	0.51	0.55	0.58	0.61	0.77	0.58	0.73	0.73	0.52	0.69
MGO	34.38	34.28	34.30	34.53	33.34	33.30	30.83	31.29	36.28	35.43
CAO	0.17	0.28	0.10	0.08	0.06	0.05	0.08	0.09	0.04	0.05
NIO	N D	N D	N D	N D	N D	N D	N D	N D	N D	N D
NA2O	-	-	-	0.18	0.19	0.63	-	-	0.14	0.11
TOTAL	99.46	99.58	99.51	100.89	101.12	100.74	99.17	99.17	100.57	100.65
ATOMIC PROPORTIONS ON THE BASIS OF 4 OXYGENS										
SI	0.986	0.995	0.994	0.989	0.980	0.991	1.002	0.995	0.994	0.996
TI	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.001	0.001
AL	0.003	0.004	0.005	0.003	0.019	0.001	0.000	0.000	0.003	0.003
FE2	0.624	0.612	0.614	0.627	0.660	0.653	0.713	0.708	0.566	0.586
MN	0.012	0.013	0.013	0.014	0.017	0.013	0.017	0.017	0.012	0.015
MG	1.381	1.371	1.373	1.368	1.328	1.330	1.262	1.281	1.423	1.395
CA	0.005	0.008	0.003	0.002	0.002	0.001	0.002	0.003	0.001	0.001
NI	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
NA	0.000	0.000	0.000	0.009	0.010	0.033	0.000	0.000	0.007	0.006
END MEMBER COMPOSITIONS										
MG	68.47	68.69	68.63	68.12	66.22	66.62	63.34	63.86	71.14	69.86
FE	31.53	31.31	31.37	31.88	33.78	33.38	36.66	36.14	28.86	30.14

LESSER ANTILLES PLUTONICS - LIST 5 - OLIVINES

	11	12	13	14	15	16	17	18	19	20
	143K1101	142K1102	545K1201	546K1202	145K1301	146K1302	IMK101	302F201	303F202	630101
OXIDE WEIGHT PERCENTAGE										
SIO2	36.29	37.21	38.62	39.03	38.43	38.74	38.20	37.94	38.06	36.77
TIO2	0.03	-	0.03	0.01	0.01	-	TR.	N D	N D	0.03
AL203	0.16	0.08	0.04	0.01	-	0.01	0.68	N D	N D	0.05
FEO	33.78	28.72	20.15	20.03	20.62	20.44	19.50	24.84	24.12	24.85
MNO	0.91	0.75	0.29	0.30	0.31	0.33	0.31	0.57	0.48	0.55
MGO	29.15	32.78	41.19	40.65	39.90	39.68	41.20	37.13	36.69	36.61
CAO	0.16	0.10	0.13	0.12	0.15	0.14	0.36	0.14	0.13	0.11
NIO	N D	N D	N D	N D	N D	N D	-	0.02	0.02	0.04
NA2O	0.35	0.24	-	-	-	-	-	N D	N D	-
TOTAL	100.83	99.88	100.45	100.15	99.42	99.34	100.25	100.64	99.50	99.01
ATOMIC PROPORTIONS ON THE BASIS OF 4 OXYGENS										
SI	0.995	1.003	0.990	1.002	0.998	1.005	0.979	0.994	1.004	0.983
TI	0.001	0.000	0.001	0.000	0.000	0.000	0.000	0.000	0.000	0.001
AL	0.005	0.003	0.001	0.000	0.000	0.000	0.021	0.000	0.000	0.002
FE2	0.774	0.647	0.432	0.430	0.448	0.443	0.418	0.544	0.532	0.555
MN	0.021	0.017	0.006	0.007	0.007	0.007	0.007	0.013	0.011	0.012
MG	1.191	1.316	1.574	1.555	1.544	1.534	1.574	1.450	1.443	1.458
CA	0.005	0.003	0.004	0.003	0.004	0.004	0.010	0.004	0.004	0.003
NI	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.001
NA	0.019	0.013	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
END MEMBER COMPOSITIONS										
MG	59.95	66.46	78.21	78.08	77.25	77.29	78.75	72.24	72.65	71.97
FE	40.05	33.54	21.79	21.92	22.75	22.71	21.25	27.76	27.35	28.03

LESSER ANTILLES PLUTONICS - LIST 5 - OLIVINES

	21	22	23	24	25	26	27	28	29	30
	64D102	65D401	298D801	299D802	61D1201	62D1202	1D1401	2D1402	901601	10D1602
OXIDE WEIGHT PERCENTAGE										
SIO2	37.81	37.73	36.76	36.43	37.56	36.99	37.45	37.50	38.26	37.97
TIO2	0.02	0.03	N D	N D	0.02	0.01	0.02	0.04	0.04	0.06
AL2O3	0.03	0.05	N D	N D	0.09	0.07	0.14	0.17	0.15	0.06
FEO	25.27	25.74	26.85	26.64	24.87	27.23	28.61	27.20	28.95	28.60
MNO	0.51	0.46	0.56	0.53	0.55	0.60	-	0.44	0.68	0.71
MGO	36.92	35.86	35.29	36.15	37.23	35.74	33.77	34.83	31.43	32.75
CAO	0.14	0.07	0.16	0.17	0.15	0.12	0.13	0.15	0.17	0.15
NIO	-	0.11	0.06	0.04	0.15	0.04	N D	N D	N D	N D
NA2O	-	-	N D	N D	-	-	N D	N D	N D	N D
TOTAL	100.70	100.05	99.68	99.96	100.62	100.80	100.12	100.33	99.68	100.30
ATOMIC PROPORTIONS ON THE BASIS OF 4 OXYGENS										
SI	0.992	0.998	0.985	0.973	0.986	0.981	1.001	0.996	1.029	1.015
TI	0.000	0.001	0.000	0.000	0.000	0.000	0.000	0.001	0.001	0.001
AL	0.001	0.002	0.000	0.000	0.003	0.002	0.004	0.005	0.005	0.002
FE2	0.554	0.570	0.602	0.595	0.546	0.604	0.640	0.604	0.651	0.639
MN	0.011	0.010	0.013	0.012	0.012	0.013	0.000	0.010	0.015	0.016
MG	1.443	1.414	1.409	1.439	1.456	1.412	1.346	1.379	1.260	1.304
CA	0.004	0.002	0.005	0.005	0.004	0.003	0.004	0.004	0.005	0.004
NI	0.000	0.002	0.001	0.001	0.003	0.001	0.000	0.000	0.000	0.000
NA	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
END MEMBER COMPOSITIONS										
MG	71.84	70.92	69.64	70.33	72.29	69.58	67.77	69.18	65.39	66.56
FE	28.16	29.08	30.36	29.67	27.71	30.42	32.23	30.82	34.61	33.44

LESSER ANTILLES PLUTONICS - LIST 5 - OLIVINES

	31	32	33	34	35	36	37	38	39	40
	300D1701	301D1702	544D2001	308D2101	309D2102	306L101	307L102	305V101	304V102	JLV74001
OXIDE WEIGHT PERCENTAGE										
SIO2	37.59	37.24	38.79	37.58	38.14	40.92	41.09	38.28	38.32	38.63
TIO2	N D	N D	-	N D	N D	N D	N D	N D	0.05	TR.
AL2O3	N D	N D	0.11	N D	N D	N D	N D	N D	0.04	-
FEO	25.86	26.63	22.54	28.43	26.49	9.78	9.80	22.60	23.08	20.23
MNO	0.54	0.53	0.29	0.59	0.53	0.13	0.13	0.41	0.37	0.33
MGO	35.25	35.73	38.65	33.54	34.90	48.64	48.56	37.56	38.38	40.74
CAO	0.12	0.10	0.13	0.11	0.10	0.14	0.10	0.16	0.18	TR.
NIO	0.03	0.05	N D	0.11	0.05	0.23	0.20	0.01	N D	TR.
NA2O	N D	N D	0.04	N D	N D	N D	N D	N D	-	N D
TOTAL	99.39	100.28	100.55	100.36	100.21	99.84	99.88	99.02	100.42	99.94
ATOMIC PROPORTIONS ON THE BASIS OF 4 OXYGENS										
SI	1.002	0.989	1.003	1.004	1.010	1.004	1.007	1.007	0.996	0.995
TI	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.001	0.000
AL	0.000	0.000	0.003	0.000	0.000	0.000	0.000	0.000	0.001	0.000
FE2	0.577	0.591	0.487	0.635	0.587	0.201	0.201	0.497	0.502	0.436
MN	0.012	0.012	0.006	0.013	0.012	0.003	0.003	0.009	0.008	0.007
MG	1.401	1.414	1.489	1.336	1.377	1.779	1.774	1.473	1.487	1.565
CA	0.003	0.003	0.004	0.003	0.003	0.004	0.003	0.005	0.005	0.000
NI	0.001	0.001	0.000	0.002	0.001	0.005	0.004	0.000	0.000	0.000
NA	0.000	0.000	0.002	0.000	0.000	0.000	0.000	0.000	0.000	0.000
END MEMBER COMPOSITIONS										
MG	70.40	70.09	75.10	67.31	69.70	89.74	89.70	74.41	74.46	77.92
FE	29.60	29.91	24.90	32.69	30.30	10.26	10.30	25.59	25.54	22.08

LESSER ANTILLES PLUTONICS - LIST 5 - OLIVINES

	41	42	43	44	45	46	47	48	49	50
	JLV77001	JLV77401	JLV89601	IMV101	IMV201	IMV301	294B101	295B102	292X101	293X102
OXIDE WEIGHT PERCENTAGE										
SIO2	38.38	37.82	38.06	37.40	38.20	38.00	35.81	35.94	39.52	39.05
TIO2	TR.	TR.	TR.	TR.	TR.	TR.	N D	N D	N D	N D
AL2O3	-	N D	N D	0.55	0.32	0.37	N D	N D	0.10	N D
FEO	21.63	24.72	23.25	22.90	24.20	21.90	35.04	34.01	17.86	20.63
MNO	0.34	0.46	0.39	0.40	0.46	0.37	0.67	0.63	0.39	0.56
MGO	40.01	36.84	38.32	38.70	37.00	40.10	28.69	28.75	42.12	38.94
CAO	TR.	TR.	TR.	0.31	0.43	0.41	0.20	0.18	0.08	0.12
NIO	TR.	N D	N D	-	-	-	0.02	0.06	0.29	0.20
NA2O	N D	N D	N D	-	-	-	N D	N D	N D	N D
TOTAL	100.37	99.85	100.03	100.26	100.61	101.15	100.43	99.57	100.36	99.50
ATOMIC PROPORTIONS ON THE BASIS OF 4 OXYGENS										
SI	0.992	0.998	0.995	0.976	0.997	0.977	0.991	0.998	1.003	1.013
TI	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
AL	0.000	0.000	0.000	0.017	0.010	0.011	0.000	0.000	0.003	0.000
FE2	0.467	0.545	0.508	0.500	0.528	0.471	0.811	0.790	0.379	0.448
MN	0.007	0.010	0.009	0.009	0.010	0.008	0.016	0.015	0.008	0.012
MG	1.541	1.448	1.493	1.505	1.439	1.537	1.183	1.190	1.593	1.505
CA	0.000	0.000	0.000	0.009	0.012	0.011	0.006	0.005	0.002	0.003
NI	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.001	0.006	0.004
NA	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
END MEMBER COMPOSITIONS										
MG	76.44	72.27	74.28	74.74	72.77	76.23	58.87	59.65	80.44	76.60
FE	23.56	27.73	25.72	25.26	27.23	23.77	41.13	40.35	19.56	23.40

LESSER ANTILLES PLUTONICS - LIST 5 - OLIVINES

	51	52	53	54	55	56	57	58
	547X301	548X302	289X401	290X402	291X403	RAX24501	RAX24502	JR47D01
OXIDE WEIGHT PERCENTAGE								
SIO2	39.05	38.68	40.12	40.10	40.04	40.25	40.47	N D
TIO2	0.04	0.02	N D	N D	N D	-	-	N D
AL2O3	0.02	0.07	N D	N D	N D	-	-	N D
FEO	18.66	19.77	12.35	12.23	11.76	16.40	17.04	26.79
MNO	0.28	0.36	0.16	0.17	0.18	-	-	0.40
MGO	42.03	41.21	46.94	47.53	47.58	43.54	42.98	37.50
CAO	0.15	0.23	0.03	0.03	0.16	0.09	0.09	N D
NIO	N D	0.23	0.30	0.30	0.19	N D	N D	N D
NA2O	0.03	N D	N D	N D	N D	-	-	N D
TOTAL	100.26	100.57	99.90	100.36	99.91	100.28	100.58	64.70
ATOMIC PROPORTIONS ON THE BASIS OF 4 OXYGENS								
SI	0.995	0.990	0.997	0.992	0.993	1.011	1.016	0.000
TI	0.001	0.000	0.000	0.000	0.000	0.000	0.000	0.000
AL	0.001	0.002	0.000	0.000	0.000	0.000	0.000	0.000
FE2	0.398	0.423	0.257	0.253	0.244	0.345	0.358	1.140
MN	0.006	0.008	0.003	0.004	0.004	0.000	0.000	0.017
MG	1.597	1.572	1.738	1.752	1.758	1.630	1.607	2.842
CA	0.004	0.006	0.001	0.001	0.004	0.002	0.002	0.000
NI	0.000	0.005	0.006	0.006	0.004	0.000	0.000	0.000
NA	0.001	0.000	0.000	0.000	0.000	0.000	0.000	0.000
END MEMBER COMPOSITIONS								
MG	79.81	78.48	86.99	87.23	87.65	82.55	81.80	71.07
FE	20.19	21.52	13.01	12.77	12.35	17.45	18.20	28.93

LESSER ANTILLES PLUTONICS - LIST 6A - SPINELS

	1	2	3	4	5	6	7	8	9	10
	475E2M1	476E2M2	471E3M1	472E3M2	473K1M1	474K1M2	190K2M1	194K2M2	195K2M3	196K2M4
OXIDE WEIGHT PERCENTAGE										
SIO2	0.24	0.23	0.21	0.19	0.22	0.20	0.20	0.09	0.30	0.44
TIO2	7.60	7.43	7.11	9.11	7.91	7.34	10.02	6.19	5.64	10.06
AL2O3	7.15	7.09	6.93	5.49	4.54	4.86	2.19	10.04	9.35	2.52
V2O3	0.65	0.65	0.84	0.79	0.89	0.88	0.63	0.33	0.43	0.47
CR2O3	0.07	0.02	0.02	-	0.01	0.07	0.09	0.14	0.08	0.08
FEO	75.09	74.95	75.66	74.29	79.05	78.72	80.45	75.89	76.18	79.34
MNO	0.37	0.35	0.29	0.29	0.40	0.36	0.40	0.48	0.43	0.50
MGO	3.40	3.74	4.32	4.65	2.51	2.92	1.05	2.25	2.02	1.62
CAO	0.02	0.04	0.01	0.14	0.03	0.03	0.03	0.01	0.02	0.01
TOTAL	94.59	94.50	95.39	94.95	95.56	95.38	95.06	95.42	94.45	95.04
CORRECTED ANALYSES (AFTER CARMICHAEL, 1967)										
ILMENITE BASIS										
FE2O3	51.15	51.67	53.14	52.14	54.05	54.53	53.07	49.95	50.36	52.70
FEO	29.06	28.45	27.84	27.37	30.41	29.65	32.70	30.94	30.86	31.91
TOTAL	99.71	99.67	100.71	100.17	100.97	100.84	100.37	100.42	99.49	100.32
ULVOSPINEL BASIS										
FE2O3	45.88	46.52	48.22	45.91	48.59	49.47	46.21	45.75	46.34	45.61
FEO	33.81	33.09	32.27	32.98	35.33	34.21	38.86	34.72	34.48	38.30
TOTAL	99.18	99.16	100.22	99.55	100.42	100.33	99.69	100.00	99.09	99.61
% USP	21.49	20.95	19.76	25.27	22.44	20.74	28.97	16.91	16.40	29.79

LESSER ANTILLES PLUTONICS - LIST 6A - SPINELS

	11	12	13	14	15	16	17	18	19	20
	193K2S1	198K3M1	201K3M2	477K5M1	480K5M2	517K7M1	518K7M2	520K8M1	521K9M1	524K9M2
OXIDE WEIGHT PERCENTAGE										
SIO2	-	0.46	0.44	0.24	0.18	0.24	0.24	0.29	0.23	0.16
TIO2	0.33	9.98	9.84	11.03	10.85	6.77	6.72	12.61	7.98	6.78
AL2O3	51.39	2.32	2.31	2.34	2.52	5.29	5.28	1.45	0.80	6.97
V2O3	0.19	0.45	0.79	0.96	1.03	0.63	0.65	0.06	0.43	0.29
CR2O3	-	0.08	0.08	0.08	0.07	0.04	0.08	-	0.09	0.32
FEO	37.08	80.23	80.20	78.70	78.90	77.69	77.95	78.67	83.76	78.86
MNO	0.28	0.39	0.43	0.52	0.52	0.36	0.35	0.59	0.45	0.49
MGO	9.46	1.38	1.43	1.57	1.64	3.33	3.25	1.46	0.60	1.26
CAO	-	0.05	0.02	0.04	0.05	0.02	0.03	0.04	-	0.05
TOTAL	98.73	95.34	95.54	95.48	95.76	94.37	94.55	95.17	94.34	95.18
CORRECTED ANALYSES (AFTER CARMICHAEL, 1967)										
ILMENITE BASIS										
FE2O3	13.05	53.15	53.19	51.66	51.96	54.52	54.63	51.26	57.06	51.99
FEO	25.34	32.40	32.34	32.22	32.14	28.63	28.79	32.54	32.41	32.07
TOTAL	100.04	100.66	100.86	100.65	100.96	99.83	100.02	100.30	100.05	100.38
ULVOSPINEL BASIS										
FE2O3	12.83	46.09	46.24	44.09	44.58	49.80	49.94	42.60	51.54	47.33
FEO	25.54	38.75	38.59	39.02	38.79	32.88	33.01	40.34	37.38	36.27
TOTAL	100.01	99.95	100.17	99.89	100.22	99.36	99.55	99.43	99.50	99.92
% USP	0.70	29.63	29.09	31.70	30.85	19.42	19.26	36.63	23.69	19.18

LESSER ANTILLES PLUTONICS - LIST 6A - SPINELS

	21	22	23	24	25	26	27	28	29	30
	523K9S1	525K10M1	527K11M1	506F1M1	507F1M2	504F2M1	505F2M2	508D1M1	528D6M1	511D8M1
OXIDE WEIGHT PERCENTAGE										
SIO2	0.16	0.22	0.18	0.19	0.21	0.19	0.20	0.23	0.19	0.17
TIO2	0.14	9.50	7.92	5.62	5.86	5.82	5.81	8.55	9.91	9.42
AL2O3	57.27	1.13	4.62	8.79	8.79	7.16	7.43	5.89	2.07	4.40
V2O3	0.13	0.42	0.33	0.39	0.39	0.40	0.32	0.79	0.20	0.88
CR2O3	0.05	0.08	0.03	0.03	0.03	0.04	0.03	0.04	0.04	0.18
FEO	29.59	81.90	78.89	76.34	75.71	77.19	77.10	75.97	80.85	75.65
MNO	0.19	0.52	0.55	0.39	0.37	0.30	0.34	0.32	0.38	0.28
MGO	12.43	1.06	2.16	3.96	3.96	3.81	3.94	3.75	0.68	3.46
CAO	-	0.03	0.12	0.02	0.01	-	0.02	0.03	0.03	0.02
TOTAL	99.96	94.86	94.80	95.73	95.33	94.91	95.19	95.57	94.35	94.46
CORRECTED ANALYSES (AFTER CARMICHAEL, 1967)										
ILMENITE BASIS										
FE2O3	8.27	55.20	53.85	53.45	52.78	54.50	54.55	52.23	53.17	51.74
FEO	22.15	32.22	30.43	28.24	28.22	28.14	28.02	28.97	33.00	29.09
TOTAL	100.79	100.39	100.19	101.08	100.61	100.37	100.65	100.80	99.67	99.64
ULVOSPINEL BASIS										
FE2O3	8.04	48.68	48.41	49.53	48.69	50.46	50.50	46.33	46.40	45.32
FEO	22.36	38.09	35.32	31.76	31.90	31.78	31.66	34.27	39.09	34.87
TOTAL	100.76	99.73	99.65	100.69	100.20	99.96	100.25	100.21	99.00	99.00
% USP	0.71	27.74	22.54	15.55	16.32	16.34	16.27	23.87	28.93	26.55

LESSER ANTILLES PLUTONICS - LIST 6A - SPINELS

	31	32	33	34	35	36	37	38	39	40
	512D8M2	509D14M1	510D16M1	496D17M1	497D17M2	498D18M1	499D18M2	515D20M1	310D21M1	316M1M1
OXIDE WEIGHT PERCENTAGE										
SIO2	0.26	0.29	0.23	0.19	0.23	0.21	0.24	0.24	0.19	0.06
TIO2	10.64	10.11	10.66	8.41	8.43	9.44	8.87	16.45	8.83	8.63
AL2O3	3.11	5.04	4.89	5.83	6.21	3.46	3.17	3.58	4.32	2.28
V2O3	1.13	0.83	0.19	0.77	0.67	0.36	0.38	1.05	0.68	1.25
CR2O3	0.20	0.11	0.08	0.03	0.05	0.04	0.09	0.78	0.11	4.16
FEO	76.93	75.71	75.73	76.10	74.89	78.58	79.29	70.32	77.78	75.04
MNO	0.35	0.39	0.47	0.31	0.40	0.37	0.45	0.37	0.41	0.43
MGO	2.93	3.14	3.44	3.67	3.82	2.40	2.30	3.86	2.88	2.75
CAO	0.02	0.01	0.02	0.01	0.02	0.02	0.01	0.02	0.03	0.07
TOTAL	95.57	95.63	95.71	95.32	94.72	94.88	94.80	96.67	95.23	94.67
CORRECTED ANALYSES (AFTER CARMICHAEL, 1967)										
ILMENITE BASIS										
FE2O3	51.73	50.58	51.06	52.37	51.53	53.26	54.18	43.80	53.18	50.72
FEO	30.38	30.19	29.78	28.97	28.52	30.65	30.53	30.90	29.93	29.40
TOTAL	100.75	100.69	100.82	100.56	99.88	100.21	100.22	101.05	100.55	99.75
ULVOSPINEL BASIS										
FE2O3	44.41	43.59	43.76	46.60	45.71	46.78	48.06	32.63	47.13	44.92
FEO	36.96	36.48	36.35	34.17	33.76	36.48	36.04	40.96	35.37	34.62
TOTAL	100.02	99.99	100.09	99.98	99.30	99.56	99.61	99.94	99.95	99.17
% USP	30.22	28.56	29.77	23.43	23.70	26.96	25.55	45.48	24.91	24.31

LESSER ANTILLES PLUTONICS - LIST 6A - SPINELS

	41	42	43	44	45	46	47	48	49	50
	318M2M1	311L1M1	312L1M2	319L2M1	320L4M1	494L9M1	495L9M2	492L10M1	493L10M2	500V1M1
OXIDE WEIGHT PERCENTAGE										
SIO2	0.16	0.21	0.12	0.11	0.24	0.26	0.26	0.22	0.22	0.14
TIO2	5.45	0.02	0.03	7.20	4.89	10.29	10.75	8.31	8.31	7.33
AL2O3	1.64	-	0.14	7.10	7.93	4.64	4.25	7.44	7.48	7.08
V2O3	0.40	-	-	0.83	0.21	0.75	0.77	0.31	0.52	0.62
CR2O3	0.04	0.06	0.03	0.04	10.25	0.03	0.10	0.08	0.05	0.04
FEO	82.95	92.00	91.13	76.04	69.06	76.30	76.43	74.64	74.63	75.76
MNO	0.57	0.02	0.07	0.27	0.55	0.35	0.34	0.34	0.34	0.30
MGO	1.66	0.28	0.06	3.65	2.68	3.21	2.93	4.11	4.24	4.34
CAO	0.02	0.03	0.05	0.01	0.04	0.02	0.03	0.03	0.02	-
TOTAL	93.89	92.62	91.63	95.25	95.85	95.85	95.86	95.48	95.81	95.61
CORRECTED ANALYSES (AFTER CARMICHAEL, 1967)										
ILMENITE BASIS										
FE2O3	58.64	68.35	67.49	52.46	43.88	51.26	50.86	51.25	51.32	53.14
FEO	30.18	30.49	30.40	28.83	29.57	30.17	30.66	28.52	28.44	27.94
TOTAL	99.76	99.46	98.39	100.50	100.24	100.98	100.95	100.61	100.95	100.93
ULVOSPINEL BASIS										
FE2O3	54.20	68.15	67.36	47.56	40.41	44.18	43.46	45.52	45.59	48.14
FEO	34.17	30.67	30.51	33.24	32.70	36.55	37.32	33.67	33.60	32.44
TOTAL	99.32	99.44	98.37	100.31	99.90	100.27	100.21	100.04	100.37	100.43
% USP	18.87	0.87	0.56	19.76	14.03	28.91	30.29	22.99	22.89	20.04

LESSER ANTILLES PLUTONICS - LIST 6A - SPINELS

	51	52	53	54	55	56	57	58	59	60
	501V1M2	481C1M1	482C1M2	483C2M1	484C2M2	486C3M1	487C3M2	488X1M1	489X1M2	490X2M1
OXIDE WEIGHT PERCENTAGE										
SIO2	0.20	0.25	0.19	0.21	0.24	0.16	0.27	0.22	0.16	0.21
TIO2	7.33	5.49	5.50	5.24	5.37	5.56	5.73	3.88	4.10	4.57
AL203	7.22	5.09	5.19	5.38	5.79	4.94	5.16	6.62	6.57	5.95
V203	0.72	0.64	0.64	0.51	0.38	0.61	0.62	0.32	0.43	0.61
CR203	0.05	0.07	0.04	0.18	0.17	0.11	0.14	4.16	2.85	0.08
FEO	74.86	80.64	80.31	80.56	78.75	79.99	78.86	75.28	77.23	79.86
MNO	0.28	0.38	0.39	0.43	0.46	0.49	0.45	0.38	0.39	0.38
MGO	4.38	2.93	2.94	2.80	3.19	3.11	3.21	4.37	3.64	3.34
CAO	-	0.04	0.02	0.03	0.07	0.03	0.07	0.03	0.01	0.02
TOTAL	95.04	95.53	95.22	95.34	94.42	95.00	94.51	95.26	95.38	95.02
CORRECTED ANALYSES (AFTER CARMICHAEL, 1967)										
ILMENITE BASIS										
FE203	52.35	57.15	56.91	57.00	55.96	57.08	56.05	54.05	54.87	57.30
FEO	27.75	29.21	29.10	29.26	28.39	28.62	28.42	26.64	27.85	28.30
TOTAL	100.28	101.25	100.92	101.05	100.02	100.71	100.12	100.67	100.87	100.76
ULVOSPINEL BASIS										
FE203	47.29	53.27	53.08	53.33	52.17	53.24	51.99	51.27	52.00	54.07
FEO	32.30	32.70	32.55	32.57	31.80	32.08	32.07	29.14	30.44	31.21
TOTAL	99.77	100.86	100.53	100.68	99.64	100.33	99.71	100.39	100.59	100.43
% USP	20.35	15.80	15.66	15.01	15.54	15.75	16.66	11.17	11.59	13.13

LESSER ANTILLES PLUTONICS - LIST 6A - SPINELS

	61	62	63	64
	491X2M2	502X3M1	503X3M2	RAX245M1
OXIDE WEIGHT PERCENTAGE				
SIO2	0.22	0.26	0.19	0.05
TIO2	4.50	6.73	5.69	8.94
AL2O3	6.09	5.90	7.29	7.12
V2O3	0.61	0.28	0.23	N D
CR2O3	0.15	5.58	8.91	N D
FEO	79.90	72.24	68.67	75.32
MNO	0.38	0.39	0.38	N D
MGO	3.34	4.13	4.51	3.50
CAO	0.03	0.16	0.15	0.21
TOTAL	95.22	95.67	96.02	95.14
CORRECTED ANALYSES (AFTER CARMICHAEL, 1967)				
ILMENITE BASIS				
FE2O3	57.28	49.57	46.29	50.90
FEO	28.36	27.63	27.01	29.51
TOTAL	100.95	100.63	100.65	100.24
ULVOSPINEL BASIS				
FE2O3	54.08	44.86	42.33	44.90
FEO	31.23	31.87	30.58	34.91
TOTAL	100.63	100.16	100.26	99.64
% USP	12.94	19.01	15.79	24.31

SPINELS - LIST 68 - FE2O3:FEO DISTRIBUTION,AFTER CARMICHAEL (1967)

	1	2	3	4	5	6	7	8	9	10
	475E2M1	476E2M2	471E3M1	472E3M2	473K1M1	474K1M2	190K2M1	194K2M2	195K2M3	196K2M4
OXIDE WEIGHT PERCENTAGE										
SIO2	0.24	0.23	0.21	0.19	0.22	0.20	0.20	0.09	0.30	0.44
TIO2	7.60	7.43	7.11	9.11	7.91	7.34	10.02	6.19	5.64	10.06
AL2O3	7.15	7.09	6.93	5.49	4.54	4.86	2.19	10.04	9.35	2.52
V2O3	0.65	0.65	0.84	0.79	0.89	0.88	0.63	0.33	0.43	0.47
CR2O3	0.07	0.02	0.02	-	0.01	0.07	0.09	0.14	0.08	0.08
FE2O3	45.88	46.52	48.22	45.91	48.59	49.47	46.21	45.75	46.34	45.61
FEO	33.81	33.09	32.27	32.98	35.33	34.21	38.86	34.72	34.48	38.30
MNO	0.37	0.35	0.29	0.29	0.40	0.36	0.40	0.48	0.43	0.50
MGO	3.40	3.74	4.32	4.65	2.51	2.92	1.05	2.25	2.02	1.62
CAO	0.02	0.04	0.01	0.14	0.03	0.03	0.03	0.01	0.02	0.01
TOTAL	99.19	99.16	100.22	99.55	100.43	100.34	99.68	100.00	99.09	99.61
ATOMIC PROPORTIONS ON THE BASIS OF 32 OXYGENS										
SI	0.069	0.066	0.060	0.055	0.064	0.058	0.060	0.026	0.087	0.131
TI	1.649	1.610	1.521	1.967	1.731	1.601	2.257	1.327	1.225	2.252
AL	2.432	2.408	2.323	1.858	1.557	1.662	0.773	3.374	3.184	0.884
V	0.150	0.150	0.191	0.182	0.207	0.204	0.151	0.075	0.099	0.112
CR	0.016	0.005	0.004	0.000	0.002	0.016	0.021	0.032	0.018	0.019
FE3	9.962	10.084	10.318	9.916	10.640	10.797	10.417	9.813	10.073	10.216
FE2	8.159	7.972	7.675	7.917	8.598	8.298	9.736	8.277	8.330	9.534
MN	0.090	0.085	0.070	0.071	0.099	0.088	0.102	0.116	0.105	0.126
MG	1.462	1.605	1.831	1.989	1.088	1.262	0.469	0.956	0.869	0.719
CA	0.006	0.012	0.003	0.043	0.009	0.009	0.010	0.003	0.006	0.003

SPINELS - LIST 68 - FE2O3:FEO DISTRIBUTION,AFTER CARMICHAEL (1967)

	11	12	13	14	15	16	17	18	19	20
	193K2S1	198K3M1	201K3M2	477K5M1	480K5M2	517K7M1	518K7M2	520K8M1	521K9M1	524K9M2
OXIDE WEIGHT PERCENTAGE										
SIO2	-	0.46	0.44	0.24	0.18	0.24	0.24	0.29	0.23	0.16
TIO2	0.33	9.98	9.84	11.03	10.85	6.77	6.72	12.61	7.98	6.78
AL2O3	51.39	2.32	2.31	2.34	2.52	5.29	5.28	1.45	0.80	6.97
V2O3	0.19	0.45	0.79	0.96	1.03	0.63	0.65	0.06	0.43	0.29
CR2O3	-	0.08	0.08	0.08	0.07	0.04	0.08	-	0.09	0.32
FE2O3	12.83	46.09	46.24	44.09	44.58	49.80	49.94	42.60	51.54	47.33
FEO	25.54	38.75	38.59	39.02	38.79	32.88	33.01	40.34	37.38	36.27
MNO	0.28	0.39	0.43	0.52	0.52	0.36	0.35	0.59	0.45	0.49
MGO	9.46	1.38	1.43	1.57	1.64	3.33	3.25	1.46	0.60	1.26
CAO	-	0.05	0.02	0.04	0.05	0.02	0.03	0.04	-	0.05
TOTAL	100.02	99.95	100.17	99.89	100.23	99.36	99.55	99.44	99.50	99.92
ATOMIC PROPORTIONS ON THE BASIS OF 32 OXYGENS										
SI	0.000	0.137	0.131	0.071	0.053	0.070	0.070	0.087	0.070	0.047
TI	0.056	2.233	2.197	2.465	2.414	1.483	1.471	2.843	1.825	1.488
AL	13.675	0.814	0.808	0.820	0.879	1.817	1.811	0.512	0.287	2.397
V	0.034	0.107	0.188	0.228	0.244	0.147	0.151	0.014	0.105	0.068
CR	0.000	0.019	0.019	0.019	0.016	0.009	0.018	0.000	0.022	0.074
FE3	2.179	10.319	10.328	9.858	9.924	10.918	10.936	9.610	11.794	10.390
FE2	4.822	9.642	9.579	9.696	9.597	8.011	8.034	10.114	9.506	8.849
MN	0.054	0.098	0.108	0.131	0.130	0.089	0.086	0.150	0.116	0.121
MG	3.182	0.612	0.632	0.695	0.723	1.446	1.409	0.652	0.272	0.548
CA	0.000	0.016	0.006	0.013	0.016	0.006	0.009	0.013	0.000	0.016

SPINELS - LIST 6B - FE2O3:FEO DISTRIBUTION,AFTER CARMICHAEL (1967)

	21	22	23	24	25	26	27	28	29	30
	523K9S1	525K10M1	527K11M1	506F1M1	507F1M2	504F2M1	505F2M2	508D1M1	528D6M1	511D8M1
OXIDE WEIGHT PERCENTAGE										
SIO2	0.16	0.22	0.18	0.19	0.21	0.19	0.20	0.23	0.19	0.17
TIO2	0.14	9.50	7.92	5.62	5.86	5.82	5.81	8.55	9.91	9.42
AL2O3	57.27	1.13	4.62	8.79	8.79	7.16	7.43	5.89	2.07	4.40
V2O3	0.13	0.42	0.33	0.39	0.39	0.40	0.32	0.79	0.20	0.88
CR2O3	0.05	0.08	0.03	0.03	0.03	0.04	0.03	0.04	0.04	0.18
FE2O3	8.04	48.68	48.41	49.53	48.69	50.46	50.50	46.33	46.40	45.32
FEO	22.36	38.09	35.32	31.76	31.90	31.78	31.66	34.27	39.09	34.87
MNO	0.19	0.52	0.55	0.39	0.37	0.30	0.34	0.32	0.38	0.28
MGO	12.43	1.06	2.16	3.96	3.96	3.81	3.94	3.75	0.68	3.46
CAO	-	0.03	0.12	0.02	0.01	-	0.02	0.03	0.03	0.02
TOTAL	100.77	99.73	99.64	100.68	100.21	99.96	100.25	100.20	98.99	99.00
ATOMIC PROPORTIONS ON THE BASIS OF 32 OXYGENS										
SI	0.034	0.066	0.053	0.054	0.059	0.054	0.057	0.066	0.058	0.050
TI	0.023	2.153	1.751	1.190	1.246	1.253	1.244	1.844	2.257	2.074
AL	14.552	0.401	1.601	2.918	2.930	2.416	2.494	1.991	0.739	1.518
V	0.022	0.101	0.078	0.088	0.088	0.092	0.073	0.181	0.048	0.206
CR	0.009	0.019	0.007	0.007	0.007	0.009	0.007	0.009	0.010	0.042
FE3	1.304	11.038	10.706	10.497	10.361	10.868	10.821	9.997	10.572	9.984
FE2	4.031	9.599	8.681	7.481	7.544	7.607	7.540	8.218	9.899	8.537
MN	0.035	0.133	0.137	0.093	0.089	0.073	0.082	0.078	0.097	0.069
MG	3.992	0.476	0.946	1.662	1.669	1.625	1.672	1.602	0.307	1.509
CA	0.000	0.010	0.038	0.006	0.003	0.000	0.006	0.009	0.010	0.006

SPINELS - LIST 6B - FE2O3:FEO DISTRIBUTION, AFTER CARMICHAEL (1967)

	31	32	33	34	35	36	37	38	39	40
	512D8M2	509D14M1	510D16M1	496D17M1	497D17M2	498D18M1	499D18M2	515D20M1	310D21M1	316M1M1
OXIDE WEIGHT PERCENTAGE										
SIO2	0.26	0.29	0.23	0.19	0.23	0.21	0.24	0.24	0.19	0.06
TIO2	10.64	10.11	10.66	8.41	8.43	9.44	8.87	16.45	8.83	8.63
AL2O3	3.11	5.04	4.89	5.83	6.21	3.46	3.17	3.58	4.32	2.28
V2O3	1.13	0.83	0.19	0.77	0.67	0.36	0.38	1.05	0.68	1.25
CR2O3	0.20	0.11	0.08	0.03	0.05	0.04	0.09	0.78	0.11	4.16
FE2O3	44.41	43.59	43.76	46.60	45.71	46.78	48.06	32.63	47.13	44.92
FEO	36.96	36.48	36.35	34.17	33.76	35.48	36.04	40.96	35.37	34.62
MNO	0.35	0.39	0.47	0.31	0.40	0.37	0.45	0.37	0.41	0.43
MGO	2.93	3.14	3.44	3.67	3.82	2.40	2.30	3.86	2.88	2.75
CAO	0.02	0.01	0.02	0.01	0.02	0.02	0.01	0.02	0.03	0.07
TOTAL	100.01	99.99	100.09	99.99	99.30	99.56	99.61	99.94	99.95	99.17
ATOMIC PROPORTIONS ON THE BASIS OF 32 OXYGENS										
SI	0.076	0.084	0.066	0.055	0.066	0.062	0.071	0.069	0.055	0.018
TI	2.341	2.200	2.315	1.820	1.830	2.095	1.973	3.569	1.937	1.927
AL	1.073	1.719	1.665	1.977	2.113	1.203	1.105	1.217	1.485	0.798
V	0.265	0.192	0.044	0.177	0.155	0.085	0.090	0.243	0.159	0.297
CR	0.046	0.025	0.018	0.007	0.011	0.009	0.021	0.178	0.025	0.976
FE3	9.779	9.493	9.509	10.088	9.927	10.386	10.694	7.083	10.344	10.036
FE2	9.045	8.829	8.778	8.221	8.148	9.002	8.913	9.882	8.628	8.596
MN	0.087	0.096	0.115	0.076	0.098	0.092	0.113	0.090	0.101	0.108
MG	1.278	1.354	1.480	1.573	1.643	1.055	1.013	1.659	1.252	1.217
CA	0.006	0.003	0.006	0.003	0.006	0.006	0.003	0.006	0.009	0.022

SPINELS - LIST 68 - FE203:FEO DISTRIBUTION, AFTER CARMICHAEL (1967)

	41	42	43	44	45	46	47	48	49	50
	318M2M1	311L1M1	312L1M2	319L2M1	320L4M1	494L9M1	495L9M2	492L10M1	493L10M2	500V1M1
OXIDE WEIGHT PERCENTAGE										
SIO2	0.16	0.21	0.12	0.11	0.24	0.26	0.26	0.22	0.22	0.14
TIO2	5.45	0.02	0.03	7.20	4.89	10.29	10.75	8.31	8.31	7.33
AL203	1.64	-	0.14	7.10	7.93	4.64	4.25	7.44	7.48	7.08
V203	0.40	-	-	0.83	0.21	0.75	0.77	0.31	0.52	0.62
CR203	0.04	0.06	0.03	0.04	10.25	0.03	0.10	0.08	0.05	0.04
FE203	54.20	68.15	67.36	47.56	40.41	44.18	43.46	45.52	45.59	48.14
FEO	34.17	30.67	30.51	33.24	32.70	36.55	37.32	33.67	33.60	32.44
MNO	0.57	0.02	0.07	0.27	0.55	0.35	0.34	0.34	0.34	0.30
MGO	1.66	0.28	0.06	3.65	2.68	3.21	2.93	4.11	4.24	4.34
CAO	0.02	0.03	0.05	0.01	0.04	0.02	0.03	0.03	0.02	-
TOTAL	99.31	99.44	98.37	100.01	99.90	100.28	100.21	100.03	100.37	100.43
ATOMIC PROPORTIONS ON THE BASIS OF 32 OXYGENS										
SI	0.048	0.065	0.038	0.031	0.069	0.075	0.075	0.063	0.062	0.040
TI	1.462	0.005	0.007	1.549	1.053	2.237	2.347	1.777	1.769	1.564
AL	0.583	0.000	0.052	2.395	2.677	1.581	1.455	2.493	2.496	2.367
V	0.097	0.000	0.000	0.190	0.048	0.174	0.179	0.071	0.118	0.141
CR	0.010	0.015	0.007	0.009	2.320	0.007	0.023	0.018	0.011	0.009
FE3	12.289	15.843	15.850	10.241	8.708	9.611	9.495	9.738	9.710	10.275
FE2	8.611	7.924	7.979	7.955	7.832	8.837	9.062	8.005	7.954	7.695
MN	0.145	0.005	0.019	0.065	0.133	0.086	0.084	0.082	0.082	0.072
MG	0.745	0.129	0.028	1.556	1.144	1.383	1.268	1.741	1.788	1.834
CA	0.006	0.010	0.017	0.003	0.012	0.006	0.009	0.009	0.006	0.009

SPINELS - LIST 6B - FE2O3:FEO DISTRIBUTION, AFTER CARMICHAEL (1967)

	51	52	53	54	55	56	57	58	59	60
	501V1M2	481C1M1	482C1M2	483C2M1	484C2M2	486C3M1	487C3M2	488X1M1	489X1M2	490X2M1
OXIDE WEIGHT PERCENTAGE										
SIO2	0.20	0.25	0.19	0.21	0.24	0.16	0.27	0.22	0.16	0.21
TIO2	7.33	5.49	5.50	5.24	5.37	5.56	5.73	3.88	4.10	4.57
AL2O3	7.22	5.09	5.19	5.38	5.79	4.94	5.16	6.62	6.57	5.95
V2O3	0.72	0.64	0.64	0.51	0.38	0.61	0.62	0.32	0.43	0.61
CR2O3	0.04	0.07	0.04	0.18	0.17	0.11	0.14	4.16	2.85	0.08
FE2O3	47.29	53.27	53.08	53.33	52.17	53.24	51.99	51.27	52.00	54.07
FEO	32.30	32.70	32.55	32.57	31.80	32.08	32.07	29.14	30.44	31.21
MNO	0.28	0.38	0.39	0.43	0.46	0.49	0.45	0.38	0.39	0.38
MGO	4.38	2.93	2.94	2.80	3.19	3.11	3.21	4.37	3.64	3.34
CAO	-	0.04	0.02	0.03	0.07	0.03	0.07	0.03	0.01	0.02
TOTAL	99.76	100.86	100.54	100.68	99.64	100.33	99.71	100.39	100.59	100.44
ATOMIC PROPORTIONS ON THE BASIS OF 32 OXYGENS										
SI	0.057	0.072	0.055	0.061	0.070	0.046	0.079	0.063	0.046	0.060
TI	1.571	1.192	1.197	1.140	1.173	1.213	1.254	0.831	0.882	0.990
AL	2.426	1.732	1.771	1.834	1.983	1.689	1.770	2.221	2.214	2.020
V	0.164	0.148	0.148	0.118	0.088	0.142	0.144	0.073	0.098	0.141
CR	0.009	0.016	0.009	0.041	0.039	0.025	0.032	0.936	0.644	0.018
FE3	10.142	11.573	11.564	11.604	11.403	11.622	11.386	10.981	11.186	11.718
FE2	7.699	7.896	7.881	7.877	7.725	7.783	7.805	6.937	7.278	7.517
MN	0.068	0.093	0.096	0.105	0.113	0.120	0.111	0.092	0.094	0.093
MG	1.860	1.261	1.268	1.207	1.381	1.344	1.392	1.854	1.551	1.433
CA	0.000	0.012	0.006	0.009	0.022	0.009	0.022	0.009	0.003	0.006

SPINELS - LIST 6B - FE2O3:FEO DISTRIBUTION, AFTER CARMICHAEL (1967)

	61	62	63	64	65	66
	491X2M2	502X3M1	503X3M2	RAX245M1	JLV7741M	JLV774QM
OXIDE WEIGHT PERCENTAGE						
SIO2	0.22	0.26	0.19	0.05	0.05	0.08
TIO2	4.50	6.73	5.69	8.94	7.10	7.43
AL2O3	6.09	5.90	7.29	7.12	5.88	6.08
V2O3	0.61	0.28	0.23	N D	0.16	0.14
CR2O3	0.15	5.58	8.91	N D	TR.	TR.
FE2O3	54.08	44.86	42.33	44.90	50.04	50.02
FEO	31.23	31.87	30.58	34.91	32.31	32.23
MNO	0.38	0.39	0.38	N D	0.23	0.21
MGO	3.34	4.13	4.51	3.50	4.02	4.32
CAO	0.03	0.16	0.15	0.21	0.14	0.18
TOTAL	100.63	100.16	100.26	99.63	99.93	100.69
ATOMIC PROPORTIONS ON THE BASIS OF 32 OXYGENS						
SI	0.063	0.074	0.054	0.014	0.014	0.023
TI	0.972	1.446	1.209	1.930	1.536	1.590
AL	2.062	1.987	2.428	2.410	1.994	2.039
V	0.140	0.064	0.052	0.000	0.037	0.032
CR	0.034	1.260	1.990	0.000	0.000	0.000
FE3	11.690	9.646	9.001	9.700	10.834	10.707
FE2	7.503	7.616	7.227	8.381	7.774	7.667
MN	0.092	0.094	0.091	0.000	0.056	0.051
MG	1.430	1.759	1.899	1.497	1.723	1.831
CA	0.009	0.049	0.045	0.065	0.043	0.055

LESSER ANTILLES PLUTONICS - LIST 7A - ILMENITES

	1	2	3	4	5	6	7	8	9	10
	191K2T1	197K2T2	199K3T1	200K3T2	478K5T1	479K5T2	519K8T1	522K9T1	526K10T1	514D20T1
OXIDE WEIGHT PERCENTAGE										
SIO2	0.16	0.32	0.32	0.24	0.21	0.16	0.18	0.17	0.18	0.22
TIO2	45.32	45.96	45.75	45.06	45.74	45.15	44.42	48.04	46.04	46.53
AL203	0.26	0.31	0.29	0.34	0.31	0.31	0.21	0.09	0.20	0.28
V203	0.06	0.18	-	0.14	N D	N D	0.04	-	0.02	0.50
CR203	0.03	0.03	0.01	-	0.03	0.02	0.03	0.02	-	0.23
FEO	49.60	49.78	49.32	49.36	49.57	49.51	50.43	48.56	49.01	46.49
MNO	0.55	0.58	0.51	0.54	0.58	0.61	0.66	0.84	0.74	0.35
MGO	2.09	2.10	2.39	2.34	2.63	2.65	2.36	1.36	2.13	3.67
CAO	0.02	0.03	-	0.02	0.01	0.02	0.04	0.02	0.07	0.08
TOTAL	98.09	99.29	98.59	98.04	99.08	98.43	98.37	99.10	98.39	98.35
CORRECTED ANALYSES (AFTER CARMICHAEL, 1967)										
FE203	14.40	13.82	13.97	14.77	14.97	15.65	16.89	9.40	13.37	46.49
FEO	36.64	37.34	36.75	36.07	36.10	35.43	35.24	40.10	36.98	0.35
TOTAL	99.53	100.67	99.99	99.52	100.58	100.00	100.06	100.04	99.73	98.35
% R203	14.07	13.55	13.53	14.56	14.41	15.12	16.23	9.02	12.90	-0.00

LESSER ANTILLES PLUTONICS - LIST 7A - ILMENITES

	11	12	13	14	15	16
	315M1T1	317M2T1	313L1T1	314L1T2	516L6T1	485B1T1
OXIDE WEIGHT PERCENTAGE						
SIO2	0.06	0.02	0.04	0.08	0.18	0.19
TIO2	45.70	43.55	56.44	52.24	51.62	52.42
AL2O3	0.31	0.14	0.23	0.30	0.18	0.33
V2O3	0.18	-	0.10	0.08	0.08	N D
CR2O3	0.55	0.03	0.03	-	-	0.03
FEO	46.76	50.19	38.66	43.79	45.15	41.33
MNO	0.41	0.98	0.67	0.66	0.81	0.56
MGO	4.79	3.03	1.91	2.32	1.45	4.45
CAO	0.04	0.03	0.16	0.04	0.02	0.22
TOTAL	98.80	97.97	98.24	99.51	99.49	99.53
CORRECTED ANALYSES (AFTER CARMICHAEL, 1967)						
FE2O3	16.22	19.37	-8.73	1.75	2.16	3.05
FEO	32.17	32.76	46.51	42.22	43.20	38.59
TOTAL	100.42	99.91	97.36	99.68	99.71	99.83
% R2O3	16.03	18.39	-7.86	2.15	2.38	3.30

ILMENITES - LIST 78 - FE2O3:FEO DISTRIBUTION,AFTER CARMICHAEL (1967)

	1	2	3	4	5	6	7	8	9	10
	191K2T1	197K2T2	199K3T1	203K3T2	478K5T1	479K5T2	519K8T1	522K9T1	526K10T1	514D20T1
OXIDE WEIGHT PERCENTAGE										
SIO2	0.16	0.32	0.32	0.24	0.21	0.16	0.18	0.17	0.18	0.22
TIO2	45.32	45.96	45.75	45.06	45.74	45.15	44.42	48.04	46.04	46.53
AL2O3	0.26	0.31	0.29	0.34	0.31	0.31	0.21	0.09	0.20	0.28
V2O3	0.06	0.18	-	0.14	N D	N D	0.04	-	0.02	0.50
CR2O3	0.03	0.03	0.01	-	0.03	0.02	0.03	0.02	-	0.23
FE2O3	14.40	13.82	13.97	14.77	14.97	15.65	16.89	9.40	13.37	46.49
FEO	36.64	37.34	36.75	36.37	36.10	35.43	35.24	40.10	36.98	0.35
MNO	0.55	0.58	0.51	0.54	0.58	0.61	0.66	0.84	0.74	0.35
MGO	2.09	2.10	2.39	2.34	2.63	2.65	2.36	1.36	2.13	3.67
CAO	0.02	0.03	-	0.02	0.01	0.02	0.04	0.02	0.07	0.08
TOTAL	99.53	100.67	99.99	99.52	100.58	100.00	100.07	100.04	99.73	98.70
ATOMIC PROPORTIONS ON THE BASIS OF 6 OXYGENS										
SI	0.008	0.016	0.016	0.012	0.010	0.008	0.009	0.009	0.009	0.010
TI	1.710	1.713	1.713	1.697	1.701	1.689	1.666	1.811	1.733	1.610
AL	0.015	0.018	0.017	0.020	0.018	0.018	0.012	0.005	0.012	0.015
V	0.002	0.007	0.000	0.006	0.000	0.000	0.002	0.000	0.001	0.018
CR	0.001	0.001	0.000	0.000	0.001	0.001	0.001	0.001	0.000	0.008
FE3	0.544	0.515	0.524	0.556	0.557	0.586	0.634	0.355	0.503	1.609
FE2	1.538	1.548	1.531	1.510	1.493	1.474	1.470	1.681	1.548	0.013
MN	0.023	0.024	0.022	0.023	0.024	0.026	0.028	0.036	0.031	0.014
MG	0.156	0.155	0.177	0.175	0.194	0.196	0.175	0.102	0.159	0.252
CA	0.001	0.002	0.000	0.001	0.001	0.001	0.002	0.001	0.004	0.004

ILMENITES - LIST 7B - FE2O3:FEO DISTRIBUTION, AFTER CARMICHAEL (1967)

	11	12	13	14	15	16
	315M1T1	317M2T1	313L1T1	314L1T2	516L6T1	485B1T1
OXIDE WEIGHT PERCENTAGE						
SIO2	0.06	0.02	0.04	0.08	0.18	0.19
TIO2	45.70	43.55	56.44	52.24	51.62	52.42
AL2O3	0.31	0.14	0.23	0.30	0.18	0.33
V2O3	0.18	-	0.10	0.08	0.08	N D
CR2O3	0.55	0.03	0.03	-	-	0.03
FE2O3	16.22	19.37	-	1.75	2.16	3.05
FEO	32.17	32.76	38.66	42.22	43.20	38.59
MNO	0.41	0.98	0.67	0.66	0.81	0.56
MGO	4.79	3.03	1.91	2.32	1.45	4.45
CAO	0.04	0.03	0.16	0.04	0.02	0.22
TOTAL	100.43	99.91	98.24	99.69	99.70	99.84
ATOMIC PROPORTIONS ON THE BASIS OF 6 OXYGENS						
SI	0.003	0.001	0.002	0.004	0.009	0.009
TI	1.676	1.631	2.097	1.953	1.943	1.924
AL	0.018	0.008	0.013	0.018	0.011	0.019
V	0.007	0.000	0.004	0.003	0.003	0.000
CR	0.021	0.001	0.001	0.000	0.000	0.001
FE3	0.595	0.726	0.000	0.065	0.081	0.112
FE2	1.312	1.364	1.597	1.755	1.809	1.575
MN	0.017	0.041	0.028	0.028	0.034	0.023
MG	0.348	0.225	0.141	0.172	0.108	0.324
CA	0.002	0.002	0.008	0.002	0.001	0.012

LESSER ANTILLES PLUTONICS - LIST 8 - BIOTITES

	1	2	3	4	5	6
	531K9B1	532K10B1	533K10B2	529L6B1	530L6B2	549L9B1
OXIDE WEIGHT PERCENTAGE						
SIO2	38.19	37.28	37.10	35.26	35.01	38.90
TIO2	4.44	4.38	5.72	4.58	4.39	3.32
AL2O3	12.41	14.16	14.29	14.92	14.61	14.61
FEO	17.09	12.34	12.73	22.90	23.10	14.35
MNO	0.11	0.09	0.10	0.17	0.19	0.14
MGO	14.15	16.95	15.65	8.72	8.68	15.01
CAO	0.53	0.04	0.09	0.02	-	0.45
K2O	8.38	9.78	9.30	9.07	9.09	8.09
NA2O	0.07	0.07	0.14	0.41	0.41	0.46
TOTAL	95.37	95.09	95.12	96.05	95.48	95.33
ATOMIC PROPORTIONS ON THE BASIS OF 22 OXYGENS						
SI	5.735	5.533	5.503	5.451	5.459	5.734
TI	0.502	0.489	0.638	0.533	0.515	0.368
AL	2.197	2.478	2.499	2.719	2.686	2.539
FE2	2.147	1.532	1.579	2.961	3.013	1.769
MN	0.014	0.011	0.013	0.022	0.025	0.017
MG	3.167	3.749	3.460	2.009	2.017	3.298
CA	0.085	0.006	0.014	0.003	0.000	0.071
K	1.606	1.852	1.760	1.789	1.809	1.522
NA	0.020	0.020	0.040	0.123	0.124	0.132
END MEMBER COMPOSITIONS						
MG	59.44	70.84	68.49	40.24	39.90	64.86
FE	40.56	29.16	31.51	59.76	60.10	35.14

LESSER ANTILLES PLUTONICS-LIST 9A- SCORIA PROBE ANALYSES(ALL FE AS FEO)

	1-E3	2-E3	3-E3	4-E3	5-E4	6-E4	7-K4	8-K4	9-K5	10-K5
PERCENT										
SIO2	49.34	50.69	52.37	50.83	49.09	49.47	64.75	61.97	71.72	68.50
TIO2	1.17	1.20	1.25	0.85	0.73	0.84	0.52	0.33	0.50	0.35
AL2O3	19.40	17.15	18.79	18.98	18.65	20.04	14.45	15.90	13.31	14.03
FEO	9.74	12.08	10.44	10.33	8.53	8.81	6.44	5.40	2.63	2.84
MNO	0.30	0.33	0.19	0.18	0.29	0.16	0.12	0.17	0.06	0.04
MGO	4.25	5.08	3.86	4.05	6.64	4.56	1.99	0.93	0.48	0.78
CAO	10.27	10.14	10.22	10.34	10.77	9.90	3.62	3.91	2.43	2.36
NA2O	2.41	2.70	2.74	2.97	2.71	3.42	2.96	4.13	3.67	3.82
K2O	0.20	0.17	0.23	0.23	0.28	0.34	0.58	0.61	2.13	1.80
TOTAL	97.16	99.53	99.62	98.75	97.70	97.54	95.43	93.33	96.92	94.51

LESSER ANTILLES PLUTONICS-LIST 9A- SCORIA PROBE ANALYSES(ALL FE AS FEO)

	11-K11	12-K11	13-K12	14-K12	15-K12	16-K13	17-K13	18-F1	19-F1	20-F1
PERCENT										
SIO2	55.16	61.76	47.04	53.54	53.14	51.12	53.63	51.28	51.57	53.18
TIO2	0.53	0.62	0.47	0.79	1.02	1.34	1.50	1.01	1.05	0.86
AL203	15.55	15.36	24.94	16.53	19.76	19.08	16.34	16.44	18.08	16.64
FEO	7.29	7.17	4.76	10.65	9.52	10.95	9.78	11.22	10.50	11.20
MNO	0.18	0.18	0.15	0.25	0.19	0.17	0.28	0.29	0.26	0.35
MGO	2.08	1.95	2.91	3.17	3.37	3.25	2.98	4.90	4.79	3.84
CAO	4.55	4.29	11.66	9.34	8.97	8.88	9.15	8.58	9.27	8.93
NA2O	2.58	2.46	2.90	2.78	3.00	2.72	4.01	3.15	3.31	3.34
K2O	0.54	0.52	0.20	0.24	0.30	0.57	0.53	0.59	0.38	0.45
TOTAL	88.46	94.32	95.02	97.29	99.28	98.07	98.19	97.56	99.20	98.82

LESSER ANTILLES PLUTONICS-LIST 9A- SCORIA PROBE ANALYSES(ALL FE AS FEO)

	21-F2	22-F2	23-F2	24-D6	25-D6	26-D14	27-D14	28-M2	29-M2	30-L1
PERCENT										
SIO2	52.18	51.46	52.98	79.81	78.67	72.48	72.31	75.51	76.96	72.29
TIO2	0.82	0.84	0.89	0.24	0.28	1.07	0.78	0.44	0.29	0.15
AL2O3	18.49	17.95	17.02	11.14	11.61	12.99	12.92	11.99	12.10	10.91
FEO	10.54	10.52	11.09	0.22	0.36	2.03	1.65	0.53	0.34	0.94
MNO	0.24	0.26	0.24	0.01	0.04	0.08	0.03	0.01	0.01	0.07
MGO	4.01	4.85	3.84	0.31	0.32	0.29	0.47	0.13	0.24	0.20
CAO	9.42	9.64	8.53	2.23	2.28	0.42	0.23	3.09	3.24	0.83
NA2O	3.02	2.93	3.44	4.33	4.52	3.98	3.64	4.08	3.45	3.08
K2O	0.44	0.36	0.47	0.60	0.87	5.22	6.13	0.35	0.30	3.55
TOTAL	99.14	98.81	98.50	98.86	98.96	98.56	98.15	96.12	96.92	92.01

LESSER ANTILLES PLUTONICS-LIST 9A- SCORIA PROBE ANALYSES(ALL FE AS FEO)

	31-L1	32-L1	33-L2	34-L2	35-L4	36-L10	37-L10	38-V1	39-V1	40-V1
PERCENT										
SIO2	77.08	74.79	55.47	58.16	56.34	47.59	41.36	53.97	54.45	53.86
TIO2	0.19	0.27	0.30	0.10	0.16	1.66	2.42	1.50	1.16	0.76
AL203	12.00	11.48	16.56	16.42	26.84	18.06	15.97	16.50	15.04	15.96
FEO	0.36	1.02	3.96	1.92	5.62	12.42	11.67	11.85	11.46	8.91
MNO	0.01	0.04	0.02	0.04	0.12	0.24	0.91	0.33	0.39	0.35
MGO	0.04	0.05	2.26	1.77	4.57	1.31	7.36	3.34	4.89	6.28
CAO	2.23	1.13	5.21	4.97	2.14	3.96	9.03	7.08	7.40	7.90
NA20	4.34	2.62	0.74	0.77	0.39	2.30	2.83	4.06	3.44	3.75
K20	0.24	3.77	0.75	0.68	0.33	0.39	0.27	0.84	0.47	0.55
TOTAL	96.48	95.17	85.26	84.84	90.43	87.82	91.83	99.47	98.69	98.32

LESSER ANTILLES PLUTONICS-LIST 9A- SCORIA PROBE ANALYSES(ALL FE AS FEO)

	41-X2	42-X2	43-X2
PERCENT			
SIO2	54.85	54.60	51.73
TIO2	0.81	0.80	0.50
AL203	14.23	14.41	13.43
FEO	10.80	10.23	11.72
MNO	0.42	0.30	0.52
MGO	3.10	2.16	2.41
CAO	7.49	6.08	6.93
NA2O	4.09	2.90	3.80
K2O	1.42	0.32	1.92
TOTAL	97.20	91.79	92.98

LIST 9B-SCORIA AVERAGES & NORMS (RECALC TO 100 H2O FREE,ALL FE AS FEO)

	1-E3	2-E4	3-K4	4-K5	5-K11	6-K12	7-K13	8-IMK1	9-F1	10-F2
PERCENT										
SIO2	51.96	50.72	67.44	73.21	63.96	54.34	53.36	48.28	52.78	52.83
TIO2	1.14	0.80	0.45	0.45	0.63	0.80	1.45	1.43	1.06	0.86
AL203	18.98	19.91	16.16	14.28	16.91	18.38	18.04	20.31	17.30	18.03
FEO	10.83	8.92	5.82	2.86	7.91	10.28	10.56	11.97	11.13	10.85
MNO	0.26	0.23	0.15	0.05	0.20	0.25	0.23	0.23	0.30	0.25
MGO	4.40	5.76	1.55	0.66	2.21	3.33	3.18	4.02	4.58	4.28
CAO	10.46	10.18	4.01	2.51	4.84	9.47	9.19	11.06	9.06	9.31
NA2O	1.75	3.16	3.78	3.92	2.76	2.91	3.43	2.42	3.31	3.17
K2O	0.22	0.32	0.64	2.06	0.58	0.24	0.56	0.28	0.48	0.42
TOTAL	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
CIPW NORM										
QTZ	9.60	0.00	29.80	35.20	28.90	9.30	5.90	1.30	4.00	4.70
COR	0.00	0.00	2.00	1.00	3.00	0.00	0.00	0.00	0.00	0.00
ORTH	1.30	1.90	3.80	12.20	3.40	1.40	3.30	1.70	2.90	2.50
ALB	14.90	26.90	32.10	33.20	23.50	24.80	29.30	20.70	28.20	27.00
ANOR	43.60	39.50	20.00	12.50	24.20	36.70	32.40	44.10	31.20	34.00
DIOP	7.10	9.20	0.00	0.00	0.00	8.90	11.20	9.30	11.60	10.40
HYP	17.00	16.20	9.20	3.90	12.80	13.40	11.00	15.60	15.70	15.60
OLIV	0.00	1.30	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
MAG	4.20	3.40	2.20	1.10	3.10	4.00	4.10	4.60	4.30	4.20
ILM	2.20	1.50	0.90	0.90	1.20	1.50	2.80	2.70	2.00	1.60

LIST 9B-SCORIA AVERAGES & NORMS (RECALC TO 100 H2O FREE, ALL FE AS FEO)

	11-IMF1	12-D6	13-D14	14-M2	15-L1	16-L2	17-L4	18-L10	19-V1	20-V745
PERCENT										
SIO2	52.04	79.99	73.61	79.08	78.10	66.80	62.31	49.47	54.70	51.71
TIO2	0.90	0.26	0.94	0.38	0.21	0.24	0.18	2.27	1.16	1.05
AL2O3	19.21	11.48	13.17	12.50	11.97	19.38	23.05	18.93	16.04	18.39
FEO	11.24	0.44	1.87	0.46	0.80	3.46	6.21	13.41	10.84	9.71
MNO	0.26	0.02	0.05	0.01	0.04	0.04	0.13	0.63	0.36	0.21
MGO	3.01	0.32	0.39	0.20	0.10	2.38	4.98	4.83	4.91	5.27
CAO	9.45	2.27	0.34	3.28	1.46	5.98	2.37	7.23	7.56	10.31
NA2O	3.42	4.47	3.85	3.75	3.50	0.89	0.41	2.86	3.80	2.86
K2O	0.47	0.75	5.78	0.34	3.82	0.82	0.36	0.37	0.63	0.49
TOTAL	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
CIPW NORM										
QTZ	3.40	46.20	27.70	48.70	40.00	40.80	43.50	3.90	5.10	2.80
COR	0.00	0.00	0.00	0.00	0.00	6.20	17.80	0.70	0.00	0.00
ORTH	2.80	4.40	34.20	2.00	22.60	4.90	2.10	2.20	3.80	2.90
ALB	29.20	37.80	32.60	31.70	29.60	7.60	3.50	24.40	32.40	24.40
ANOR	36.00	9.00	1.60	16.20	5.70	29.70	11.80	36.20	25.00	36.20
DIOP	9.40	1.70	0.10	0.00	1.30	0.00	0.00	0.00	10.50	12.50
HYP	13.10	0.00	1.30	0.50	0.10	9.10	18.60	23.00	16.80	15.50
OLIV	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
MAG	4.30	0.20	0.70	0.00	0.30	1.30	2.40	5.20	4.20	3.80
ILM	1.70	0.50	1.80	0.70	0.40	0.50	0.30	4.40	2.20	2.00

LIST 9B-SCORIA AVERAGES & NORMS (RECALC TO 100 H2O FREE, ALL FE AS FEO)

	21-V770	22-VLAC	23-X2
PERCENT			
SIO2	54.22	53.80	57.01
TIO2	1.25	1.44	0.83
AL2O3	16.84	15.11	14.92
FEO	10.56	10.60	11.38
MNO	0.25	0.18	0.37
MGO	4.05	7.34	2.66
CAO	8.27	8.47	7.45
NA2O	3.79	2.54	4.11
K2O	0.77	0.52	1.27
TOTAL	100.00	100.00	100.00
CIPW NORM			
QTZ	4.50	7.10	7.50
COR	0.00	0.00	0.00
ORTH	4.60	3.10	7.60
ALB	32.30	21.70	35.10
ANOR	26.90	28.50	18.70
DIOP	11.90	11.20	15.60
HYP	13.30	21.60	9.60
OLIV	0.00	0.00	0.00
MAG	4.10	4.10	4.40
ILM	2.40	2.80	1.60

LESSER ANTILLES PLUTONICS - LIST 10 - ST VINCENT GARNETS

	1	2	3
	239V2N1	243V2N2	243V2N3
OXIDE WEIGHT PERCENTAGE			
SIO2	38.61	38.56	38.32
TIO2	0.81	0.82	0.97
AL2O3	15.70	15.36	15.19
CR2O3	0.02	0.05	0.03
FEO	8.54	8.39	8.44
MNO	0.25	0.19	0.26
MGO	0.75	0.78	0.79
CAO	35.39	35.34	35.14
NA2O	0.24	0.30	0.30
TOTAL	100.31	99.79	99.44
ATOMIC PROPORTIONS ON THE BASIS OF 24 OXYGENS			
SI	6.061	6.084	6.074
TI	0.096	0.097	0.116
AL	2.906	2.858	2.839
CR	0.002	0.006	0.004
FE2	1.121	1.107	1.119
MN	0.033	0.025	0.035
MG	0.175	0.183	0.187
CA	5.954	5.976	5.969
NA	0.073	0.092	0.092
END MEMBER COMPOSITIONS			
CA	81.74	81.95	81.66
MG	2.41	2.52	2.55
FE	15.85	15.53	15.79

GEOLOGICAL ND SPECIMEN LOCALITY MAP C SOUTHERN DOMINICA

27 26 25 24 23 22 21 20 19 18 17 16 15

Salisbury
R Macoucheri
R St Joseph
St Joseph
R Layou
Layou
Tarou Cliffs
Tarou Point
R Belfast
Belfast Est
Mahaut
Massacre
Springfield Est
Check Hall R
Roger
River Est
Morne Cola Ar
▲ 710
Bells
Morne Laurent
▲ 685 M
orne Couronne
705 M
Pont Cassé
▲ 1394 M
MORNE TROIS PITONS
Boeri Lake
Boeri R
▲ 1221 M
MORNE MACAQUE (MICHOTRIN)
Laudat
Trafalgar
Emerald Pool
Tarish Pit
Fresh Water Lake
Clarke's R
Stuarts R
R O'Hara
R Castle Bruce
▲ 427 M
R Rosalie
Ma Robert
Rosalie
Rosalie Bay
Bibay
R Ouayaneri
R Sarisari
La Plaine
La Ronde R
Morne au Delise
▲ 426 M
▲ 515 M
▲ 1012 M
▲ 1070 M

Explanation

Geological Formations

- Alluvial Deposits
- Pyroclast Fall Deposits
- Volcanic Domes
- Pyroclast Flow Deposits
- Lava Flows
- Limestones
- Pre-Uplift Deposits (East Coast Marine Lavas, Pyroclastic and Rev[olcanics, worked])

Symbols

- Mountain Peaks, with heights in metres (Centres in Capitals)
- Towns and Villages
- R. Layou — Rivers
- Roads
- Centre Boundaries
- Geological Boundaries
- Site of Fumarolic Activity
- + Specimen Localities - This Work
- × Specimen Localities - Regional Project
- Est = Estate
- Pte = Pointe
- Pre-existing Dome Outlines
- Morne Patates Caldera and Crater Rims

WOODBRIDGE BAY
ROSEAU
SOUFRIERE BAY
Point Michel
Scotts Head
Pte Guignard
Loubiere
Beaubois Est
Gomier
Stewart Est
Durham Est
Giraudel
Huntingdon
Wotten Waven
Robinson Est
Goodwill
Morne Bruce
Morne Daniel
R Roseau
R Douce
R Claire
R Gillon
Morne Canot 706 M
Bellvue Chopin
Magua Est
MORNE PLAT PAYS 960 M
L'Habitant Est
Morne Cabrits
Terre Elm 866 M
Sulphur Springs
Tête Morne
R Berekua
Soufrière Village
MORNE PATATES 724 M
Gallion
R Blanche
Crabier 570
Morne Rouge
Morne Aous 372 M
Pte Des Fous
Scotts Head Village
Morne John 1006 M
MORNE ANGLAIS 1123 M
Pichelin R
Hagley 765 M
Montine
Berekua
Bois D'Inde
Palmiste
Grand Coulibri Bay
Pte Tanama
Pendu Temps R
Valley of Desolation 998 M
Morne Nicholls
WATT MOUNTAIN 1224 M
Boiling Lake
FOUNDLAND 968 M
R Jack
R Stewart
Dubuc
GRAND BAY
Pte Carib
Bagatelle Est
Font St Jean
Pte Retireau
GRAND SOUFRIERE HILLS 1052 M
Morne Gouverneur 869 M
Morne Sinai 796 M
R Boetica
Boetica
Délices
Pte Mulâtre R
Pte Mulâtre
Morne Bouche
Petit Savane
Paroux
R Savane
Wai Wai
Galba

Miles 0 1/4 1/2 3/4 1
Kilometres 0 1/10ths 1 2

Scale 1:25,000

2 3 4
3 4 5

True Grid
Magnetic
11°18'
10'06"
NORTH

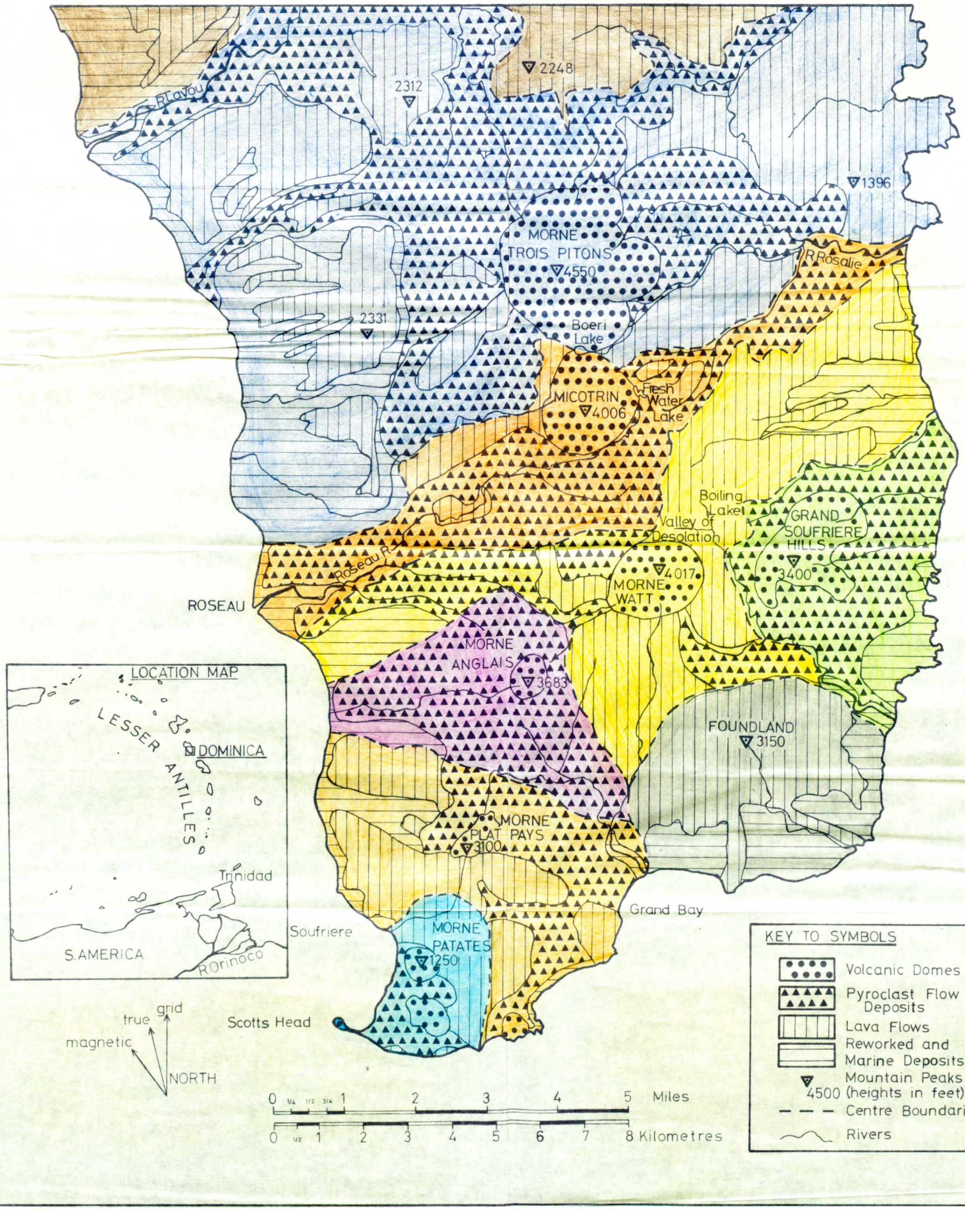
Grid Co-ordinates

Divisions ar
Longtitude
Latitude 16

Minutes of,
61°W of Greenwich
of the Equator

all +
Ⓑ=364-372
Ⓒ=211
213-4
249-50
373-6
Ⓡ= 407-425
(W-W)= 426-449

GEOLOGICAL MAP OF SOUTHERN DOMINICA



NORTHERN DOMINICA SPECIMEN LOCALITIES

61°30'00" W 61°25'00" W 61°20'00" W 61°15'00" W

15°35'00" N

15°30'00" N

Pte Jaco
Vieille Case
Morne aux Diables 861m
Morne Cabrit 180m
Portsmouth
Indian R.
Woodford Hill
R. Hodges
R. Hampstead
Wesley
Melville Hall Airfield
R. Tweed
R. Clyde
Pte Ronde
Morne Espagnol 365m
Morne Diablotins 1421m
Morne Concorde 618m
R. Pagua
Colihaut
R. Layou
Morne Fraser 693m
Castle Bruce
Salisbury

SCALE 1:50,000

0 1/4 1/2 3/4 1 2 3 4 5 MILES

0 10ths 1 2 3 4 5 6 7 8 KILOMETRES

True Grid
Magnetic
10°06"
11°18"
NORTH

KEY

× Specimen Localities (Regional Project) + This Work

▲ Mountain Peaks (heights in metres)

● Towns

Rivers

Roads